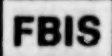


JPRS-TND-87-009

23 APRIL 1987

Worldwide Report

**NUCLEAR DEVELOPMENT
AND
PROLIFERATION**



FOREIGN BROADCAST INFORMATION SERVICE

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23 APRIL 1987

WORLDWIDE REPORT
NUCLEAR DEVELOPMENT AND PROLIFERATION

CONTENTS

ASIA

AUSTRALIA

Australian Nonproliferation Safeguards Legislation (Melbourne Overseas Service, 31 Mar 87)	1
---	---

HONG KONG

Protests, Questions on Daya Bay Continue (Hong Kong HONGKONG STANDARD, 20 Feb 87; Hong Kong SOUTH CHINA MORNING POST, 3 Mar 87)	2
Remarks by Protest Leader, by Andy Ho	2
Protesters, Lawmakers Complain	3
Daya Bay Examined in Light of Report on British Plant (Hong Kong SOUTH CHINA MORNING POST, various dates)	4
Bernard Fong Article	4
Exercise in British Democracy, Editorial	16
Government Efforts To Monitor Daya Bay Plant (Hong Kong HONGKONG STANDARD, 24 Feb, 4 Mar 87)	18
Request to Beijing, by Danny Lo, Andy Ho	18
Advisory Body Planned, by Andy Ho	19
Daya Bay Structural Foundation Set for August (Andy Ho; Hong Kong HONGKONG STANDARD, 21 Feb 87)	20

No Progress in Insurance for Nuclear Victims (Sheila Dawes, Handy Ho; Hong Kong HONGKONG STANDARD, 9 Mar 87)	21
PEOPLE'S REPUBLIC OF CHINA	
Site for First PRC Nuclear Power Plant Deemed Unsafe (Hong Kong HONGKONG STANDARD, 7 Mar 87)	22
THAILAND	
Briefs Nuclear Fuel Processing Plant Funded	24
LATIN AMERICA	
ARGENTINA	
CNEA's Constantini on Economy, Nuclear Plants (Buenos Aires NOTICIAS ARGENTINAS, 15 Mar 87)	25
BRAZIL	
Government Not To Sign Nonproliferation Treaty (Sao Paulo FOLHA DE SAO PAULO, 2 Apr 87)	27
Experts Discuss Development of Nuclear Bomb (Tania Malheiros; Sao Paulo FOLHA DE SAO PAULO, 22 Mar 87)	28
Official Discusses Development of Nuclear Program (Re: Nazareth Interview; Sao Paulo, FOLHA DE SAO PAULO, 20 Mar 87)	31
Sarney To Visit Cachimbo Military Base in May (Dalton Moreira; Sao Paulo FOLHA DE SAO PAULO, 20 Mar 87)	33
NEAR EAST/SOUTH ASIA	
INDIA	
India To Lobby in U.S. Against Pakistan Bomb (G. K. Reddy; Madras THE HINDU, 4 Mar 87)	34
U.S. Role in Pakistan Nuclear Issue Viewed (Editorial; Delhi INDIAN EXPRESS, 20 Mar 87)	35

Reaction to Reported Pakistan Bomb Told (Various Sources, various dates)	36
Foreign Ministry Spokesman, Nayar	36
Khan Statement Text	37
Timing of Interview Discussed, Editorial	37
Pressure on India, Editorial	39
Gandhi To Meet Pakistan's Nuclear 'Threat' (Delhi Domestic Service, 24 Mar 87)	40
HINDU Says 'Nuclear Option' Not Signed Away (Delhi THE HINDU, 9 Mar 87)	41
'No Option' But 'To Match' Pakistan's Nuclear Ability (Editorial; Delhi INDIAN EXPRESS, 6 Mar 87)	43
500 Megawatt Reactor Design in Advanced Stage (Delhi THE PATRIOT, 13 Mar 87)	44
Briefs	
U.S.-Pakistani Nuclear Goals Discussion Denied	45
Thorium Plant Proposed for Orissa	45
IRAN	
AFP Reports 'Nuclear Matter' Stockpiled (Paris AFP, 24 Mar 87)	46
ISRAEL	
MA'ARIV: Authors Question Nuclear Program (Ami Dor-on, Eli Teicher; Tel Aviv MA'ARIV, 22 Mar 87)	47
PAKISTAN	
Junejo Claims No Intention To Make Nuclear Bomb (Karachi Domestic Service, 4 Apr 87)	49
Change in Army Leadership Sparks Concern (G. K. Reddy; Delhi THE HINDU, 19 Mar 87)	50
AFP Cites Poll on India's Use of Nuclear Weapons (Hong Kong AFP, 19 Mar 87)	51
'Vast' Indian Capacity for Making Nuclear Weapons (Editorial; Karachi DAWN, 6 Mar 87)	52
Relevance of 'Zionist Nuclear Threat' Viewed (Editorial; Islamabad THE MUSLIM, 19 Mar 87)	54
Assembly Members Discuss Khan Interview (Anwar Iqbal; Islamabad THE MUSLIM, 6 Mar 87)	55

Paper Expresses Resentment Over U.S. Pressure on Nuclear Program (Editorial; Karachi NAWA-E WAQT, 10 Mar 87)	56
Nuclear Issue: Analyst Faults U.S. Policy (Ghani Eirabie; Islamabad THE MUSLIM, 5 Mar 87)	58
Scientist Voices Disapproval of Nuclear Energy Option (Anwar Iqbal; Islamabad THE MUSLIM, 26 Feb 87)	61

SUB-SAHARAN AFRICA

NIGERIA

Briefs	
Uranium Exploration	63

WEST EUROPE

FRANCE

Japan To Purchase Reprocessing Technology (Jean-Francois Augereau; Paris LE MONDE, 23 Jan 87)	64
Indonesia, Framatome Agreement; Belgian Order Due (Paris LE MONDE, 31 Jan 87)	66
Fire, Ice-Blockage Shut Down Saint-Laurent-Des-Eaux (Paris LE FIGARO, 26 Jan 87)	68
Briefs	
Unions Demand Freeze, Safety	69
FRG-USSR Nuclear Reactor Deal Signed	69

/9986

AUSTRALIA

AUSTRALIAN NONPROLIFERATION SAFEGUARDS LEGISLATION

BK310515 Melbourne Overseas Service in English 0430 GMT 31 Mar 87

[Text] The federal government has proclaimed its nonproliferation safeguards legislation which places strict controls on all nuclear materials and associated items throughout Australia. The legislation, which takes effect from today, formalizes Australia's international obligations to nuclear nonproliferation.

This includes the Nuclear Nonproliferation Treaty, Australia's safeguards agreement with the International Atomic Energy Agency, and Australia's bilateral nuclear safeguards agreements with 10 individual countries and the European Community.

The energy and resources minister, Senator Evans, says the legislation shows the government's commitment to preventing the further spread of nuclear weapons as well as its work toward disarmament.

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CSO: 5100/4310

PROTESTS, QUESTIONS ON DAYA BAY CONTINUE

Remarks by Protest Leader

Hong Kong HONGKONG STANDARD in English 20 Feb 87 p 1

[Article by Andy Ho]

[Text]

THE anti-nuclear lobby yesterday pledged to raise the Daya Bay issue once again as several vital issues of public concern have been left unanswered.

The Rev Fung Chi-wood, convenor of the Joint Conference for the Shelving of the Daya Bay Nuclear Plant, told *The Standard* that the 116-group body was "frustrated" by the "slow progress and inaccessibility" of the Omelco Ad Hoc Group appointed twenty weeks ago to act as a watchdog on the Daya Bay Project.

The group said that their concern will be made known to the public at a press conference this afternoon.

The Omelco group recently turned down a request from the anti-nuclear activists for a face-to-face discussion.

Rev Fung said that they wanted to raise the issue of how the Hongkong Nuclear Investment Company (HKNIC) should be brought under a scheme of control where profit margins would be monitored.

The ad hoc group had, however, only conceded to include their submissions in the five-item agenda of its meeting next Tuesday.

The Joint Conference managed to collect more than one million signatures against the Daya Bay project within two weeks last July during the height of the anti-Daya Bay protests.

Rev Fung also wants a clear statement from the ad hoc group on its view of a report on nuclear investment submitted to Legco by the Financial Secretary, Mr Piers Jacobs, last November.

Councillor Wong Po-yan, who heads the ad hoc group, declined to comment two months ago on the grounds that more time was needed to digest the 302-page document.

The group has not made any public remarks on the report since.

The Standard understands that the group discussed the paper on December 18 but could not reach a "consensus". They are expected to take up the issue again at their forthcoming meeting.

The ad hoc group was formed on October 3 to take up from where the Legco nuclear fact-finding delegations to Japan, Europe and the US left off.

A specific task designated to the group is to "liaise with the administra-

tion, HKNIC and other relevant parties for matters concerning the progress of the Daya Bay nuclear power project."

But the group has not fixed any meetings with HKNIC, which has a 25 percent share in the \$28.8 billion joint venture.

"I really do not know why we have not met any HKNIC officials," said Councillor Jackie Chan, adding that he would raise the issue at their next meeting.

The ad hoc group is also expected to "collect general information on the safety and other aspects of nuclear power plants." But before the councillors could present the public with information, the anti-nuclear coalition has got ready to launch a Nuclear Education Centre later this month.

The Rev Fung said they were now consulting their legal advisor on having their centre properly registered.

He said they would make available information on nuclear power, part of which has been submitted to the ad hoc group and is now guarded by the Omelco office as "confidential."

Other topics, such as insurance in case of nuclear mishaps and the decommissioning of the two future

pressurised water reactors, have not even been raised at any of the ad hoc group's four previous meetings.

The issue of financial liability of the partners in the Daya Bay joint venture has also not been taken up.

Protesters, Lawmakers Complain

Hong Kong SOUTH CHINA MORNING POST in English 3 Mar 87 p 2

[Text]

HONGKONG law-makers and anti-nuclear campaigners yesterday joined forces to press for a public information centre on nuclear energy as soon as possible.

It is understood the Government is working on such a plan.

But the convenor of the Legislative Council's ad hoc group monitoring the Daya Bay project, Mr Wong Pö-yan, said he hoped it could be established before the end of September.

"We are pressing the Government to speed up the whole thing," Mr Wong said.

Such a centre is seen as essential to help local residents understand more about the future Daya Bay nuclear plant.

In its latest attack on nuclear energy, the Joint Conference for the Shelving of the Daya Bay Nuclear Plant criticised the 16-member ad hoc group for working too slowly.

In defence, the deputy convenor of the group, Mr

Chung Pui-lam, said: "We are not experts, we need time to digest the stuff we receive and refer it to the relevant authorities."

He said the group had reacted quickly on questions raised by various concern groups by referring them to the Hongkong Nuclear Investment Company and the Government.

The group, which was set up four months ago, has only met twice. When it meets for the third time this month it will try to come up with a date for the Government to set up the information centre.

Petition

In a petition yesterday to the Office of the Members of the Executive and Legislative Councils, anti-nuclear lobbyist, the Reverend Fung Chi-wood asked the group to allow conference members to attend future meetings with Daya Bay officials.

The petition was received by six members of the group.

The conference members

also urged the Government to organise a public hearing on Daya Bay whereby anti-nuclear campaigners and Daya Bay nuclear experts could debate the project.

The group is also demanding:

- The Government sets up a nuclear power consultative committee. Its job would be to monitor the environmental impact on the territory and to advise the Government on possible contingency plans in case of a nuclear leakage.

- The independent monitoring group on nuclear safety set up by China allow Hongkong representatives to participate.

- an overall insurance plan for local residents against a nuclear accident.

The group also said the cost of nuclear energy should not be higher than coal-generated power, thus ensuring that consumers would not have to pay for the more expensive fuel.

/9274

CS01 5150/0107

DAYA BAY EXAMINED IN LIGHT OF REPORT ON BRITISH PLANT

Bernard Fong Article

Hong Kong SOUTH CHINA MORNING POST in English 3-6 Mar 87

[Four-part article by Bernard Fong]

[3 Mar 87 p 19]

[Text]

JUST around the time China was shopping for a nuclear power station, the Central Electricity Generating Board (CEGB) in Britain was studying plans for a giant reactor to be sited on the East Anglia coast, near the town of Leiston.

Between January 1983 and March 1985, lawyer Sir Frank Layfield and a team of engineers, physicists and accountants spent £20 million and pored over 16 million words during a public inquiry into the Sizewell B proposal.

Already a nuclear reactor at Sizewell A located on the scenic Suffolk "heritage" shore had generated some concern and controversy. The fact that Sizewell A had brought only a few permanent jobs to Leiston had not endeared the nuclear industry to the people there, and a hint of less than cordial feeling came out during the hearings.

The talk of a Sizewell B and even a Sizewell C in one coastal chain alarmed not only the legion of professional ecologists of Britain but also the millions of trekkers and ordinary animal lovers wary of the effect on marine and marsh life.

To dispel the growing disquiet and to promote the image of the CEGB, the British Govern-

ment assigned Sir Frank and his assistants - Professor J.M. Alexander, Sir Christopher Foster, Professor W.R. Hall and Dr J. Vennart - the task of assembling experts and worried citizens to analyse, debate and conclude.

The result of their travail is the eight-volume Sizewell B Public Inquiry report billed as the most thorough and arguably the most impartial study of a project in British history.

Sir Frank describes with uncharacteristic immodesty the Inquiry as "the first on a nuclear power station in the United Kingdom that gave detailed consideration to safety". The British Friends of the Earth (FOE) has quibbled with that citation.

Content

The findings explore the intricacies of the nuclear industry as no other report has ever done which, when juxtaposed with the comparatively superficial research on the Daya Bay station, provokes some new and old questions.

The estimated £1.2 billion to £1.6 billion 1,200 megawatt electric (MWe) Sizewell B Pressurised-Water Reactor (PWR) project was presented to the British public as an elaborate proposal first broached in 1981.

The 1,800 MWe Daya Bay PWRs - estimated at \$33 billion in present terms - came before the Hongkong public as a *fait accompli*, so critics contend, with a hastily hatched report by a Legislative Council team anxious to echo the opinion of China Light and Power (CLP) and the Chinese Government.

But to be fair, what CLP has published is not without merit.

After sitting for 344 days and sifting through 55 tons of testimony, Sir Frank concludes with reservations in the report that Sizewell B, the first British PWR, is viable, but barely.

Sir Frank believes that a PWR is perhaps cheaper to construct than a conventional 1,800 MWe coal-fired generator, though he concedes that it is impossible to determine how much Sizewell B may save the British consumers during its 35-year lifespan.

In arriving at the assessment, Sir Frank reviews and criticises the initial CEGB building cost estimates.

In Hongkong the nuclear power idea was broached as early as the mid-1970s when CLP, which reviews its electrical sales projections twice a year, foresaw surging demand.

In 1979 the utilities company signed a contract with the

CHART 1

Capital Cost Assumptions (May 1983 terms)

Sizewell B 1,200 MWe (CEGB est)	Daya Bay 1,800 MWe (CLP est)	Coal-fired 1,800 MWe (CEGB est)
£1.2 billion	HK\$30 billion	£1.24 billion
(Jan 1987 terms)		
£1.2 billion	HK\$33 billion	£1.24 billion
(Jan 1987 terms)		
HK\$14.4 billion	HK\$33 billion	HK\$14.9 billion

CHART 2

CEGB Capital Cost Estimates for Sizewell B

Em spring 1982 prices	April 82	Oct 83	Oct 84
Civil Engineering	223	243	240
Boiler			
Supply system	139	180	167
Turbine Generator	130	90	93
Other Mechanical			
and Electrical plant	178	192	191
Software	244	275	297
Base cost:	914	980	988
Start to finish allowance	183	117	109
Construction period extension	50	50	50
Sub-total:	1147	1147	1147
Simulators, etc.	25	25	25
Total:	1172	1172	1172

CHART 3

Exchange rates:

March 2	1982:	£1 equals US\$1.53
April	1982:	£1 equals US\$1.96
Oct	1983:	£1 equals US\$1.56
Oct	1984:	£1 equals US\$1.26
March 2	1982:	US\$1 equals HK\$7.80
May	1983:	US\$1 equals HK\$6.90

Guangdong Power Company (GPC) to provide the province with 1,136 million units of electricity.

Ever since, the demand for electricity in China and Hong Kong has grown steadily and over the years CLP predictions have been amazingly accurate to within 2.4 and 5.6 per cent of actual sales.

But then it is far easier to make predictions for Hong Kong where seasonal temperatures are relatively constant than in Britain which has to endure extremely cold spells.

Based on past performance and on the assumption that fossil fuel prices would rise, both China and CLP decided in the late 1970s that the nuclear option was the answer.

CLP then estimated demand had grown by 10 per cent a year over a decade and the trend would continue, albeit at a less hectic pace. Over a long term the growth rate should be just above seven per cent.

The company planners said Hong Kong per capita consumption of electricity was 15 per cent less than that of Singapore, 40 per cent less than Japan and Britain, and 70 per cent less than the United States. The gap, they reasoned, would narrow as Hong Kong became more affluent and its population grew.

CLP, seeing a future of close co-operation with GPC, completed a five-volume Feasibility Study by the end of 1980 which unequivocally advocated atomic energy for Hong Kong.

To work on the complicated

financing and technical details of the monumental project, CLP created the Hong Kong Nuclear Investment Company (HKNIC), which owned 25 per cent of the newly-fledged Guangdong Nuclear Power Joint Venture Company (GNPJVC) formed by GPC through the Guangdong Nuclear Investment Company (GNIC).

An "Extract from CLP's Financial Memorandum" reads: "GNPJVC would be discontinued as a joint venture at the end of the 20th year after commissioning of the second unit... and HKNIC would transfer its share, if any, to GPC at a nominal value in the 21st year after commissioning of the second unit."

The initial HKNIC investment in Daya Bay was US\$100 million, a third of what China had pledged as basic capital.

After hearing the CLP case, the Government applauded the Daya Bay deal which precluded a giant coal-fired station in Hong Kong and its financing.

The much derided November 1986 "Report to the Legislative Council on Safety and Tariff Arrangements for the Daya Bay Nuclear Power Station" backs the CLP quest:

"It has always been the Government's view that the most serious danger would be to underestimate Hong Kong's future requirements for electricity because the economy is so dependent on a reliable electricity supply.

"On the basis of even the lower growth projection of seven per cent per annum, it is clear that additional generating capacity will be needed to meet Hong Kong's electricity requirements in the mid-1990s."

What the report does not stress is that Hong Kong shall change from being an exporter of electricity to China to an importer.

Though the press routinely reports that the Daya Bay station would cost close to \$30 billion to build (Chart 1), the reality is that it would cost \$33 billion in present monetary terms.

When the \$30 billion price was quoted in May 1983, the exchange rate was US\$1 to HK\$6.90. Today it is HK\$7.80.

The portion of the CLP Memorandum shown to the public skirts many issues which are exhaustively explored in the Sizewell B report.

The CLP submission is at best a sketch whereas CEGB's is a painting, albeit a flawed one.

On "Erection, Design, Project Management and Training", the CLP Memo reads tersely: "The total cost of these items is estimated to be based on information supplied by consultants duly adjusted for local conditions."

The CEGB report (Chart 2), in contrast, details each item and its estimated cost with rather dubious adjustments made over time.

Building costs depend on many obvious and subtle factors - especially construction time. When CEGB first submitted its estimates to the public in April 1982, it predicted that Sizewell B would cost £1.147 billion - not including the price for the mock-ups and ongoing tests - over 72 months from the time of foundation setting to the date of commissioning.

At worst construction could be delayed by 18 months as CEGB acknowledged the trouble with adopting a new technology and the routine tangle with unionised labour.

The CEGB arrived at the sum and time span by examining similar PWR projects, mainly in the United States. The statistics it had culled varied greatly, since in the US itself prices changed dizzily from state to state and year to year.

Curiously the Japanese and the French, from whom China shall get its PWRs, take on average 54 to 70 months to build a 1,200 MWe reactor at home but longer elsewhere, which does not augur well for Daya Bay whose scheduled date of commission for the first unit is some time in 1992.

Tartly

Then 2½ years later the CEGB told the incredulous Sir Frank that its original estimates had now changed by one pence (Chart 2).

Sir Frank, hinting that CEGB had juggled its figures and believing the best indication of a company's performance is its history, writes tartly: "Its record on construction power stations to cost and on time has been poor."

He accepts the Council for the Protection of Rural England (CPRE) contention that Sizewell B would take 90 months to build (as compared to 150 months for

the British-designed Advanced Gas-cooled Reactor) at as much as £1.6 billion in October 1984 terms (Chart 3) when sterling was worth US\$1.26 as against today's US\$1.53.

He chides the CEGB for "seriously under-estimating the time and cost required to build Sizewell B" but praises it for improving its more recent coal-fired station construction efforts.

Sir Frank cites an Electricity Consumers' Council (ECC) report rejecting the whole CEGB cost estimate approach based on foreign examples. "Comparisons with the US could be... of use only as a point of reference," he says.

He praises the French for their "political commitment; similarity in design and design replication; the existence of a single client, Electricité de France (EdF), leading to unified design and equipment ordering; and a single architect-engineer and construction manager."

Whether that means much when French - with turbines from General Electric Company (UK) - technology is transferred to China is moot, even though Beijing seems equally committed to the nuclear power program.

Sir Frank says Britain has opted for the Westinghouse PWR, whose most famous progeny is Three Mile Island, because the United Kingdom has had a long history of commercial and military nuclear co-operation with the States - including its pivotal role in the Manhattan Project which delivered the atomic bomb and more recently in the Trident submarine program. (All PWRs have upgraded their safety technology since Three Mile Island.)

The friendship is certainly reciprocated since the Sizewell B software from Westinghouse, for example, is listed at a bargain price while Britain can count on producing its own high-grade turbines of modified American design.

Since the PWR is an American invention - though the Russians still dispute that - it is certainly cheaper to buy the technology from its creator.

Indeed what China has chosen is second-hand technology at premium cost partly because of its reluctance to sign the 1978 Nuclear Non-proliferation Treaty with the US which but

notified its contract with President Ronald Reagan during his visit to Beijing three springs ago.

American legislators in Congress, already vexed by any hi-tech sales to a communist state and worried by the alleged Chinese nuclear assistance to the Pakistani atomic weapons program, quashed the Reagan pact, forcing the Chinese to look elsewhere for a power unit that had first propelled the USS Nautilus in 1954.

Though France is keen to sell its nuclear technology to nearly anyone to defray its power program costs, it must charge the Chinese a high price, for the Daya Bay agreement could well be the only Sino-French nuclear deal of a generation.

China, with its disregard for patents and hunger for hi-tech, could indeed duplicate the PWR with its existing nuclear capability. How the Chinese aviation industry based in Chengdu has cloned the Soviet MiG-21F interceptor does not foster trust with Western exporters.

Five years ago when China added a civilian nuclear program to its successful military one, vowing to reach 10,000 plus MWe capacity by the year 2000, Western consortia - Westinghouse, Framatome of France and Kraftwerk Union of West Germany - queued up to woo Beijing with seemingly competitive bids.

Pleased

The planning and contracts manager of the Guangdong Nuclear Power Joint Venture Company, Mr Peter Littlewood, an engineer by training who is overseeing the Daya Bay project, said France was the only serious bidder for the Chinese deal, even though Westinghouse agents did vie for some consultancy business.

Exactly why the Chinese ultimately opted for the French PWR still baffles some people who are not satisfied with the CLP answer: "Based on extensive and favourable operating experience in a number of countries, well established safety standards and advantages in cost and construction time over other systems, the PWR has been selected for the nuclear station."

Mr Littlewood said China was pleased with the French standardised design, engineering quality and their excellent

record. "The French PWR has been much modified and is today significantly improved on the Westinghouse model," he said.

Sir Frank, after wading through the bewildering CEBG figures and cautioning against repeated references to American cases, decided that if Sizewell B was delayed by 18 months the capital cost would soar by £400 million, providing the pound sterling exchange rate against the US dollar would be in Britain's favour.

Sir Alistair Frame, an independent project management consultant, invited to testify several times in hearings held Suffolk, said:

"I have found delays and difficulties have often been encountered. There is no substitute for experience in a particular process or design."

The Electricity Consumers Council seconded that contention, saying the CEBG had glossed over the complications especially on the estimates for the first phase of construction.

Should such "delays and

difficulties" dog Daya Bay, the \$33 billion construction costs for the Chinese station would leap wildly as had happened to scuppered US PWRs.

Mr Littlewood said the Daya Bay work was so far on time and he expected the large French equipment to arrive late next year.

Over the past dozen years the US, once the most ardent pro-nuclear country, has dampened its nuclear fervour as one plant closes after another. Some stations stand half-built, a testimony to poor planning and dormant demand.

Every delay costs dearly, as illustrated by the Washington (state) Public Power Supply System (WPPSS) fiasco.

In 1971 a cluster of five 1,200 MWe total PWRs was planned on the initial capital budget estimate of US\$3.5 billion.

Four years later the building costs rose to US\$5 billion at a time of high interest rates as construction fell behind schedule, forcing the issue of bonds which were eagerly snapped up as a hedge against inflation and a patriotic gesture for energy self-suf-

ficiency.

By 1981, as a slew of safety laws was passed in the wake of Three Mile Island accident, costs were rising at US\$1 billion a month and before the year was out, WPPSS was bankrupt as hundreds of thousands of inhabitants of the US northwest saw their dream of "cheap and clean" power disappear.

Though the report was completed a year before the Chernobyl catastrophe, Sir Frank was prescient as he wrote: "Serious incidents overseas could lead to pressure for more stringent regulatory requirements and therefore design changes."

He agrees with the British Nuclear Installation Inspectorate (NII) that it is wise to delay construction until the design can be thoroughly re-examined and altered rather than to begin work in haste only to have changes made as the ground is cleared and the girders go up.

The advice applies just as aptly to Daya Bay where, unlike Sizewell B, the publicised research has so far been sketchy and the figures seem, in some cases, less than cogent.

[4 Mar 87 p 23]

[Text]

NOT all engineers agree that the Pressurised-Water Reactor (PWR) destined for Daya Bay and, if the Central Electricity Generating Board (CEGB) succeeds, Sizewell B on the Suffolk "heritage" coast, is the most efficient generator.

Indeed with research in the much safer fusion energy tolling and new advances being announced every month, the fission thermal reactor is doomed, its obsolescence hastened by a spate of spectacular accidents.

Basically the Sizewell B Westinghouse four-loop PWR (Daya Bay model uses three loops) like most of its predecessors, is but a fancy way of making steam to drive engines — a technology that is 200 years old.

Though in theory a kilogram of enriched uranium can produce the same power as the

burning of 3,000 tons of coal, the atomic fuel (two to three per cent enriched as compared to the 98 per cent grade required for nuclear weapons) churns out at the most a third of its energy potential because the present means to harness it is still primitive.

A lot of raw power is lost or diffused by the ducts and in the translation to thermal energy. In a century the PWR relic should have a hallowed place in the Smithsonian Institute Museum. Meanwhile the PWR is arguably the best value per energy dollar, next to the sun, the surf and the wind.

Like a car, a PWR can be a machine or a menace, depending on how it is used and who uses it.

The PWR employs pressurised water (at 150 atmospheres to keep it from boiling even at temperatures as high as 320 degrees Celsius) as both a coolant and moderator, an element to slow down the chain reaction

and turn nuclear to thermal energy.

Sir Frank Layfield, who headed the team which compiled the 3,000-page report on the proposed Sizewell B station, says the PWR system is volatile. A welded steel vessel .0203 metre thick and an elaborate mesh of valves ensure that the pressure in the boiler (heat exchanger) stays constant.

Some of the PWR quirks continue to bedevil engineers whose routine design revisions, often prodded by safety rules, are a constant in the nuclear industry and a headache to accountants.

The PWR, a 34-year-old invention developed under United States military aegis, is not exotic or new to the British whose experience with it stems from their nuclear submarine program.

But CEGB has admitted that the enlargement of a PWR from submarine to commercial reac-

tor size presents a daunting technological challenge.

When Britain officially entered the civilian nuclear age in 1962 with Queen Elizabeth throwing on the switch at Calder Hall, the country led the world with the Magnox reactor – a gas cooled and graphite moderated system.

In the 1970s Britain forged ahead with the Advanced Gas-cooled Reactor (AGR), a vastly improved derivative of the Magnox, capable of heating the coolant – carbon dioxide – to 634 degrees C, more than twice as hot as the Magnox effluence.

But over the years Britain has fallen behind West Germany and France which emulate the US in upgrading the PWR and experimenting with the Liquid Metal Fast Breeder Reactor (LMFBR) that uses liquid sodium as coolant and is not classified as a thermal system per se.

The PWR (21,000 megawatt days per ton of uranium) is five times as fuel efficient as a Magnox (4,000 mw-days) but only slightly more so than the AGR (18,000 mw-days).

The French Framatome boasts a decisive edge in PWR technology with exports to South Korea, South Africa and Belgium among others while its partner Electricite de France (EdF), which provides the major technological consultancy for Daya Bay, operates more reactors than any utilities company in the world.

Despite or because of the Government-aided building program in the 1970s, Framatome has now begun closing facilities and laying off thousands of staff.

Other similar plants are the Boiling Water Reactor (BWR) and the Canadian Deuterium Uranium (Candu) Heavy Water Reactor which India has bought and from which weapon grade material may have been extracted.

Though Sir Frank and his engineers did appraise energy options from surf to solar, they soon decided that none of these could compete against the PWR over time – and in time.

The most novel of the suggested alternatives to Sizewell B was tidal power as offered by the Severn Barrage scheme which Government engineers considered too miniscule, untested and a trifle bizarre.

Though nuclear physicists reckon the fusion system – the

meshing of lighter nuclei to form a heavier and more stable nucleus – could one day replace the fission reactor, the research, while producing promising results and a few hitches, is a generation away from being practical.

Sir Frank dismisses solar energy, the vogue power source of the ecologists, as ineffectual “for large scale electricity generation in the United Kingdom in the foreseeable future.

“Costs were too high, and solar radiation levels too low, particularly in winter.”

Geothermal energy – involving the drilling of a long tunnel deep into the earth and the pumping of water to reach the molten rocks from which the heat shall be tapped – fares no better in the report.

China Light and Power (CLP) and the Guangdong Power Company (GPC), while touting the merits of the Daya Bay station, seem not to have ever seriously considered an alternative to nuclear energy for Hong-kong.

The PWR uses three “barriers” to control the system – fuel cladding (the tube in which uranium pellets are stored) and rods of boron or similar radiation absorbing substance; a coolant; and, unlike the graphite reactor in Chernobyl, a containment dome.

Framatome, which also provides major components for the planned Sizewell B reactor, has refined the Westinghouse basic safety features and installed super-sensitive gauges and meters to guard against “human error.”

But the fundamental engineering lapses in PWR technology remain.

The Sizewell B reactor could handle 110 tons of fuel at peak capacity.

The four loops of the Sizewell B PWR and three for Daya Bay are designed to bear with exceptionally high pressure for a long period and at searing temperatures.

A Daya Bay PWR may deliver 4,000 megawatt electric (MWe) of heat at a power density of 100 kilowatts per litre.

Sir Frank believes the efficient power station is not necessarily one which churns out a higher energy capacity for less fuel.

A plant which goes out of order and fails to meet surging demand during frigid winters and torrid summers does not im-

press Sir Frank, whatever its hi-tech wizardry.

He writes: “To calculate plant performance CEBG uses the term availability (which it defines) as the potential output . . . over a given period compared with (what) it could have produced (if functioning continuously).”

The performance can be crimped not only by outages but also by maintenance and repairs.

Westinghouse recommends that the PWR be refuelled once a year.

The PWR, unlike the Magnox and the AGR, can only be refuelled when it is shut down and to restart it could take double the initial uranium dose due to the “Xenon poisoning phenomenon”, an elementary substance produced by the chain reaction that sucks up neutrons like a sponge.

When down or idle the PWR, which requires a major overhaul every 15 years, costs the public £2 million (about HK\$24 million) in 1982 terms a week, engineers have estimated.

CLP and its Chinese partner have never released a study, if they have one, on reactor performance during its teething years.

But Guangdong Nuclear Power Joint Venture Co (GNPJVC) engineer Mr Peter Littlewood said: “We have pessimistically under-estimated the Daya Bay availability to under 60 per cent for its first couple of years.” That may not be pessimism but prudence.

The PWR could break down more often and for longer spells than an AGR and certainly a coal-fired station, thus skewing the rosy cost saving forecasts CLP made for Daya Bay.

Indeed CEBG has conceded that a coal-fired station is in a way more reliable than either an AGR or a PWR, using data from American nuclear stations “with more than a year’s operating experience by 1982.”

But after the first delicate three years, the PWR tends to “settle down.” CEBG told the Inquiry that since Sizewell B would have a larger fuel capacity than do most American PWRs, it need not be refuelled so often.

Sir Frank does not share the CEBG confidence that over time the PWR would be more “available” than a coal-fired station.

CEBG told the panel the 1979 to 1982 period was espe-

cially rough for the American nuclear industry, pointing out the Three Mile Island disaster and the furore it had caused.

The Electricity Consumers Council (ECC), citing the trouble at Indian Point near New York City, argued the plant "settling performance" had declined after the first three years. To bolster its case, ECC then dwelt on the spotty CEBG record in keeping even conventional stations at peak output through some bitter winters.

With the routine blackouts and brownouts in Guangdong and the generally shoddy Chinese large project management, the Daya Bay plant, if put through the availability test ringer, could come out looking sornier than Sizewell B.

To allay that fear and a concession to the anti-nuclear lobbyists, EdF and the GNPJVC have agreed to collectively manage and operate the station.

But more damning than Sir Frank's cynicism to the CEBG case is a 1982 report from an independent group, the Committee for the Study of the Economics of Nuclear Electricity (CSENE), chaired by chief scientist at the Ministry of Power (MoP), Sir Kevin Spencer, which uses official statistics to mock the claim that nuclear energy is cheaper.

By comparing "availability," capital and management costs and alluding to dubious book-keeping practices, the Spencer survey says nuclear energy is a trifle dearer now than conventional power and is likely to stay so in the near future.

The British Monopolies and Mergers Commission (MMC) argued bluntly in 1981, when CEBG was preparing its Sizewell B case, that the whole cost estimate procedure was faulty. MMC assessors write:

"A large program of investment in nuclear power stations, which would greatly increase the capital employed for a given level of output, is proposed on the basis of investment appraisals which are seriously defective and liable to mislead.

"We conclude that the Board's course of conduct in this regard operates against the public interest."

Right now, with British demand for electricity quite stable, CEBG has an excessive capacity as both AGRs and coal-fired stations have reduced their output.

However available and reliable a PWR is, if it is forced by economic reasons to generate less power than its desired range, the fuel cost savings are negated and a nuclear reactor becomes unnecessary, except as a national status symbol.

Sir Frank gives his verdict: "Statistical analysis of American experience in operating PWRs showed that CEBG had overestimated likely availability. (1) suggested that the CEBG estimate should be reduced from 64 per cent to 58 per cent."

The law of entropy dictates that all matters decay. The statement sounds innocuous enough, except when applied to the aging of a nuclear reactor (indeed radioactivity is an elementary form of decay).

How long can a PWR operate is not a question that has been thoroughly answered. By design a PWR lives between 30 and 40 years.

Whether a PWR can save the consumer's money depends on – besides its capital costs which entail interest, fuel charge, energy demand and efficiency – how long and well it can keep going.

CLP and partner have quoted 30 years as a safe bet for the Daya Bay station. Sizing up Sizewell B, Sir Frank says: "Although it might be physically possible to replace or repair components, it may not be economic to do so."

When that happens, a PWR is officially dead.

"Economic life can also be shorter if, for example, the station's fuel becomes too expensive."

After reading post-mortem reports on American plants, Sir Frank concludes in the report that the economic life of a PWR could be precarious indeed.

When CEBG presented its estimates, it assumed the PWR would stay robust for 40 years with a major overhaul every 15 years, using Westinghouse data. Later the Board lowered the PWR life expectancy to 35 years, so long as the heart of the beast, the Reactor Pressure Vessel (RPV), beat on.

CEBG acknowledged that a PWR heart transplant had never been properly carried out, though it insisted surgery on the reactor arteries – the valves and ducts – was not too complicated an operation.

The Board conceded that the coal-fired station could live five to 10 years longer than a PWR

and 15 years longer than an AGR.

The MMC, however, said the PWR and the AGR both could wither away after a quarter century as the vessel steel grew brittle with age and the components broke down bit by bit until the repair costs and the risk of radiation forced a hastened death.

Should the Daya Bay station go through the same PWF cycle envisaged by the less sanguine MMC, then the short life of the plant would wipe out much, if not all, the savings CLP and partner have promised Hong-kong.

But then comparing the PWR to a conventional plant of 500 MWe magnitude is strictly an academic exercise since, Sir Frank says, "no such giant coal-fired station had operated for more than 17 years."

CLP has projected the "decommissioning" costs of Daya Bay at 10 per cent of the initial capital investment – that is \$3.3 billion.

Experts testifying at the Sizewell B hearings said that based on present technology, the costs to dismantle a nuclear plant could surpass the capital investment and take years.

Mr Littlewood said the decommissioning of Daya Bay was at least four decades away and by that time new technology would have evolved and the costs lowered.

Once a coal-fired generator is obsolete, it can be switched off, cut up and sold as scrap to defray the operation cost.

Nuclear reactor scrap fetches no buyers and is radioactive. How to get rid of the deadly dross is a monumental headache for scientists and technicians.

CEBG, confounded by the hassles over the planned closing of the Windscale reactor, has given a team of engineers 15 years and a research grant on robotics to do the job.

The first major decommissioning undertaking is slated for 1989 at a problem-plagued six-year-old reactor at Shippingport in the US.

So far experts have divided the operation in three distinct phases, beginning with drainage and removal of spent fuel; the demolition of the fixed structure; and ending with the carting away of the pressure vessel and decontaminating the ground.

Mr Andre Cregut of the French Atomic Energy Commission (FAEC) told an international

al symposium two years ago that decommissioning could equal 40 per cent of the initial capital costs.

The alternative to that is "entombing" or plant burial, an emergency practice carried out in Chernobyl last year by helicopters which bombed the melted core with tens of thousands of tons of cement.

That operation was facilitated by an explosion that had spread radiation far and wide and blown away the reactor dome, leaving a gaping chute for the aircraft to unload.

Should a dormant reactor be left alone, it would take centuries to shed its radioactivity.

Sir Frank says: "Decommissioning costs form a small part of the CEGB net effective cost (which in Britain is expressed in sterling per kw per annum).

"The costs of decommissioning... are inevitably uncertain. (For Sizewell B), it is not likely to begin before 2040 and in the years ahead much can change."

Professor J.W. Jeffery in his article "The Unique Dangers of Nuclear Power" printed in 1984 says "decommissioning costs arise long after the benefits have been achieved."

He believes the disassembling of a PWR is an unpleasant legacy for future generations whose power demands could well be met by less "dangerous" means.

The Stop Sizewell B Association and Ecoropa (SSBA) decried the £1 to £2 kw per annum CEGB had claimed would cover the future decommissioning expenses. The organisation said the sum was not only dismal but rather cynical.

Sir Frank agrees with SSBA, saying: "As with all other very large capital projects, the Government has to consider how far it is thought to be right to allow costs to be left for a later generation to pay and so to achieve benefits in the near future."

CLP, by assessing the decommissioning costs to be 10 per cent of the project investment, could be doing what the CEGB has been accused of; if so, the faith the planners now express in Daya Bay could be a woe to those who shall inherit, not a gift, but a responsibility experts may have shirked or overlooked.

Writer Walter Patterson rightly calls decommissioning cost estimates "guesstimates". As the nuclear industry gropes for reassuring figures, it has only deepened public scepticism it is trying hard to assuage.

[5 Mar 87 p 15]

[Text]

CHINA Light and Power (CLP) has calculated that the Daya Bay Pressurised-water Reactor (PWR) would save consumers billions of dollars over a period of more than 30 years.

CLP chairman, Lord Lawrence Kadoorie, has predicted that his brainchild could save Hongkong \$90 billion. Others believe the amount would be a third of his rosy estimate, while critics forecast \$4.5 billion or less.

How much — and whether — a PWR actually saves over such a long haul remains an educated guess.

The procedure begins with tabulating the base cost of, say, coal over a certain time. Once a pattern is established, it can be deduced that, should a trend continue, a future price can be gauged.

Then the consultants take the same method and apply it to uranium, assuming demand, which affects price and is far easier to forecast, is constant.

In practice the comparison is not so simple or straightforward. What may appear less expensive to burn may be costlier to store and transport.

The cost of uranium — which takes up 90 per cent of the operation expenses — does not stop with the material, for transportation, waste disposal and safety requirements are far more stringent for nuclear than for fossil fuel.

Even not considering the technical complications, the atomic fuel cost equation is vexing, amorphous and, like nuclear physics, a bit surreal.

Coal is not a uniform black lump of compressed carboniferous cycad which has not quite graduated to diamond. One chunk of coal does not necessarily emit the same amount of energy as another. The coal heat content (calorific value) is not constant. Like oil, coal comes in several grades and the rule is a new plant burns the substance more effectively than an old one.

Fuel costs also vary from season to season and with the ebb and flow of politics. CLP buys its coal from China, Australia, the United States and South Africa whose mineral export prices have declined along with the sinking rand and may slide further to circumvent trade sanctions.

With the unrest in South Africa, the supply from that part of the world is not guaranteed, which is in itself an argument for nuclear power.

The United States, for one, went quickly ahead with her nuclear projects during the oil crisis only to regret the problems that ensued with a hastily hatched and poorly executed program.

Energy experts believe as gospel the average coal price should climb as it becomes scarcer. But this would not mean much if uranium, now a non-parallel controlled commodity, goes up apace.

There is a chance the costs for the two fuels may rise or decline in tandem. But then, the building of a nuclear station is seldom a purely economic act, as the furore over the planned Chinese PWR evinces.

Coal is not just an ordinary commodity for Britain whose reliance on the fuel is historic and, until recently, a matter of pride, gaining a folk myth aura through the years.

Just as Sir Frank Layfield and associates were conducting their marathon hearings on the proposed Sizewell B station, the colliers went on strike to preserve what was left of a rapidly waning occupation. The protracted dispute affected the Sizewell B inquiry itself.

Sir Frank acknowledges in the report that there was pressure to abandon the Sizewell B project as a pro-labour conces-

bition to the National Union of Mineworkers (NUM).

Union leaders argued that coal mining was a tradition, a way of life. But in the hi-tech era, the romantic appeal is no thicker than the soot that coats the many derelict foundries and mills of the drab northeastern English towns and cities.

To show how essential nuclear power was, the Central Electricity Generating Board (CEGB) offered thorough coal price estimates to the panel.

The energy concern said it was paying US\$70 tce (ton of coal equivalent) in 1981 and predicted that the world price would go up to between US\$88 and US\$140 by the turn of the century. Another 30 years later it could be as high as US\$252 tce or as low as US\$100 tce, the Board said.

The figures, if credible, make nonsense of any cost saving projection.

The National Coal Board (NCB) told Sir Frank the lowest CEGB estimates were more realistic, believing that at some point the price could even dip below the 1982 charge after adjustments for inflation. The most recent coal prices certainly confirm that assessment.

The NCB case was supported by the Town and Country Planning Association (TCPA) which, combining British data with the United States Energy Information Administration (EIA) figures, concluded that by the year 2000, the range of coal costs would vary between US\$38 and US\$63 tce in 1982 monetary terms.

TCPA said US\$60 tce for the early decades of the 21st century seemed most logical as conservation could curb or contain demand while alternative energy sources and superior technology render both coal and the archaic forms of nuclear generation obsolete.

The Council for the Protection of Rural England (CPRE) broadly agreed with the CEGB forecast, saying US\$78 tce seemed a reasonable price for the first several years of the next century.

The Department of Energy (DEN) was more circumspect, believing that coal rates would rise gently.

But the 1970s and early 1980s had been a quirky time for the coal industry as prices fluctuated in keeping with the chang-

ing costs of oil and gas. Now with petroleum prices depressed, coal is cheap and should continue to be so for the next few years as the Organisation of Petroleum Exporting Countries (OPEC) members dicker over a barrel.

To its credit, CLP did tell the Government that the early 1980s had been a "highly irregular" time for fossil fuel prices and that the trend of climbing coal costs would return beyond 1990.

The CLP "Financial Memorandum" reads: "The average price of coal, consisting of term contract deliveries and spot cargo, has come down from US\$60 per ton in 1982 to the present (May 1983) US\$44 per ton which is very much below the production and delivery costs of many coal mines in the world."

Faced with the same conundrum, Sir Frank writes:

"The actual dollar price of coal delivered to ARA rose strongly during 1980, peaked in 1981 at around US\$70-\$75 tce, and then fell in 1982 and 1983 to about US\$50 tce.

"...The CEGB appear(s) to have used the 1980-1981 price as its base price.

"But it is not known whether this base price was a true reflection of the equilibrium price...

"The CEGB described the later, and lower, October 1982 price as 'severely depressed', but I note that the 1980-1981 price appeared to be relatively high."

CEGB did not accept the rival thesis and told the inquiry: "Though the level of (coal) output expands and, at certain times, will exceed demand, marginal coal prices must rise at a sufficient rate to cover all the

variable costs of existing mines and to provide an incentive for new producers to enter the market.

"...Thus a perceived growth in demand will bring on new investment in incremental capacity."

The Board then described how in the US, as the coal prices dropped, collieries would close only to open again when supply dwindled and demand perked. The coal price depression was, CEGB contended, temporary.

The Government-sponsored but unreleased Lazard's Brothers Report presents four scenarios for the swing of fuel prices.

The study claims that coal costing US\$45 tce in 1984 would rise by 11.5 per cent a year to 1991 and nine per cent thereafter. In four years coal should cost roughly US\$54 tce and US\$107 tce by the year 2000, figures which correspond to the median CEGB projections.

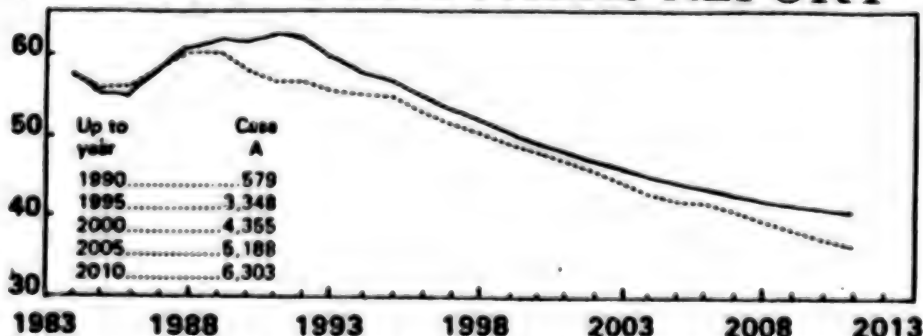
But then again the Lazard 11.5 and nine per cent increase estimates are based on a very volatile fuel price period.

If the TCPA critique of CEGB coal price estimates applies at all to the Lazard study, Hongkong may indeed pay only US\$60 to US\$70 tce 13 years hence, 10 per cent more than the existing rate.

From whom a country buys its coal also determines fuel costs. CEGB anticipated that by the year 2000, it would pay US\$82, based on March 1982 monetary terms, for South African coal; US\$106 for Australian; and between US\$93 and US\$124 for US Appalachian.

The NCB told the inquiry the figures should be 30 per cent less than the CEGB estimates while CPRE offered even more con-

LAZARD'S BROTHERS REPORT



25 per cent cost overrun and a two-year delay. Reduced capacity factor. Higher escalation rate for nuclear fuel. Maximum rate of profit at all times.

founding coal cost projections for the turn of the century: US\$73 for South African; US\$86 for Australian; and between US\$58 and US\$86 for US Appalachian.

With a jumble like that, it is no wonder that fuel price estimates are perplexing and incredible.

Now as other coal exporting countries – such as Colombia and Brazil – ply the world market, prices could drop further and faster.

Sir Frank summarises: "The CEBG gave little evidence on the structure of the world coal situation.

"It appears to consider that the entry of new producers into the market would be dominated by a few large energy companies who could control the growth of new capacity."

He rules that prices need not rise inexorably and rebukes CEBG for not "making a convincing case for the scale of its assumed cost increases."

"The CEBG appeared to be assuming both a large increase in the costs of US coal supplied to ARA up to 2030, and in continuation of royalties paid by US producers.

"I find that conjunction implausible..."

His caveat against facile predictions and biased interpretation applies just as well to CLP which, while not producing persuasive evidence, claims perhaps illusory cost savings for uranium over coal right into a century when the only certainty will be uncertainty.

CLP and associate companies now get 83 per cent of their power output from coal at 4,361 megawatt electric (MWe) total with 1,006 MWe as reserve. That Hongkong has been able to buy coal more cheaply than Britain and most other industrialised countries means the nuclear option is not so beneficial.

Case B of the Lazard analysis certainly deflates the argument for nuclear over conventional power if indeed the meagre savings over the early years of Daya Bay prove to be a reprieve and not a boon to the consumers who have been promised too much too soon.

Uranium prices vary extensively; and so CEBG based its quotes on the Energy Agency of the Organisation for Economic

Co-operation and Development (OECD) and the International Atomic Energy Agency (IAEA) estimates.

Uranium needs to be enriched – an expensive enterprise – before it can be used in the form of three per cent U-235 and 97 per cent U-238. Though the United States, the Soviet Union and France are experimenting with novel enrichment techniques, the old reliable method is still the "gaseous diffusion" conversion system.

The one and only British enrichment plant in Cheshire is temporarily closed. China is believed to have two such plants, chiefly devoted to weapons production and research.

The effective use of lasers to enrich uranium may still be a decade or two away and would not do much for Daya Bay.

Using March 1982 prices, CEBG offered a high, medium and low range for uranium cost estimates of US\$70 a pound, US\$50 a pound and US\$45 a pound for the year 2000 compared with US\$36 a pound for 1981.

CEBG said uranium would not be a cartel commodity since its production "is widely dispersed." Britain has in recent years been testing a machine that "harvests" uranium granules in sea water.

The Department of Energy (DEN) questioned the CEBG estimates, forecasting that uranium could go as high as US\$87 a pound, as low as US\$48 and at the median range of US\$55 to US\$59.

Despite the CEBG optimism that uranium prices would be stable, politics could upset its high hopes. Britain buys the bulk of its uranium from South Africa which mines the strategic heavy metal in Namibia, an illegally occupied territory ravaged by an interminable bush war.

Should the Southwest Africa People's Organisation (SWAPO) oust the Afrikaners, there is a chance it could ban uranium exports to a country it perceives as a patron of Pretoria.

CEBG told the Inquiry that SWAPO had not drafted a trade policy from its office in exile in Angola and a total embargo was most unlikely since many countries, some ostensibly hostile to Pretoria, were South Africa's veteran nuclear fuel customers.

The quest for cheap uranium has made many countries dependent on South Africa, the

world's largest lode and one of its tenses regions. Britain is not happy with that arrangement and so she has begun to look elsewhere for a more reliable supplier.

Canada – and Australia soon – also exports uranium to Britain but not at the bargain South African price.

China is self-sufficient in uranium and, not being a free market society, could keep nuclear fuel costs low to pay for Daya Bay and her other reactors planned for or before next century.

Effective

Judging the net effective cost (NEC) of any project is hard enough over five years – and over 35 or so, it is well nigh impossible.

With Sizewell B, CEBG calculated the usual variables like capacity need now, the near and the distant future; the ageing of the coal-oil-fired plants; and the eventual obsolescence of the Advanced Gas-cooled Reactor (AGR) and Magnox on a 28 per cent planning margin.

To soothe the cynics who insisted savings from Sizewell B would be too marginal to make the project worthwhile, CEBG dealt with the nebulous – such as whether nuclear energy supply would grow quickly (called High Nuclear Background or HNB for short), by a little (Medium Nuclear Background or MNB) or not at all (No New Nuclear Background or NNNB).

The rationale is that the faster and larger the nuclear industry expands, the more it would save, providing no major accidents happen and demand goes up.

For Hongkong, where one nuclear station is quite enough unless China decides to go with Daya Bay II, the NEC savings, if any, would be decided by the anticipated surge in demand here and in Guangdong.

CLP can theoretically lower its coal-fired station energy output when Daya Bay comes on steam and make the nuclear plant appear more efficient.

The utilities company has estimated that "nuclear electricity purchased in the mid-1990s will make up approximately 25 per cent of (our) total electricity requirement."

"The percentage share of nuclear electricity will, however,

decline as total CLP sales continue to grow."

The Guangdong Nuclear Investment Co (GNIC) has vowed, according to the "Report to the Legislative Council on Safety and Tariff Arrangements", to keep the Daya Bay generated energy unit price the same or below that of coal-fired power.

The report states: "Hong-kong consumers will not be required to pay more for this portion of the nuclear electricity purchase if nuclear production turns out to be more expensive during the initial years of operation."

Ideally Daya Bay should provide Hongkong with the cheapest and cleanest energy.

CEGB, however, has never made such a generous promise to the British public, realising no doubt the harsher reality of nuclear power cost savings with its long atomic experience.

The anti-nuclear front in Hongkong has said that the public is willing to pay more for electricity to have Daya Bay scrapped.

China seems unmoved by the gesture for, to Beijing, nuclear is more than a matter of NEC but one of national prestige and future benefits.

For CEGB, a nuclear station is so expensive to build and in theory not very costly to run, the temptation is to drive it hard and charge a mint to cover the initial investment, the interest rate, and profit on top.

Whereas some Government-owned utilities companies may bear a loss to provide a service, it is not conceivable that CLP and foreign exchange hungry China would settle for less unless the Chinese believe the rewards lie elsewhere.

A glimpse of that can be seen in the Chinese refusal to sign the Nuclear Non-proliferation Treaty with the United States.

Many nuclear stations are in operation simply because the countries which have invested so heavily in them cannot swallow their pride and let projects die even if it is more economical to do so.

CLP insists the French and American nuclear dilemma of over-capacity would not afflict Hongkong, which is obliged to buy 70 per cent of the Daya Bay output, even if the industrial miracle in Guangdong goes bust

and the station works way below peak performance.

In America, the nuclear industry landscape is now littered with dormant or sluggish stations and broken dreams.

The British example is chastening. In 1969 the Atomic Power Constructors firm collapsed and the two remaining contractors were ordered by the Labour Government to merge. The hybrid, National Nuclear Corporation (NNC), lived but a few years.

Calculated

Since the 1970s the once proud British nuclear industry has been in eclipse. That Britain has to buy American atomic technology speaks much of that demise.

NEC is calculated according to pound sterling per kilowatt for Britain and US dollars per kw in Hongkong. How high or low the charge depends - besides fuel and operation costs - on demand which CLP judges to be high and getting higher.

Counting on 25 per cent cost over-runs and a two-year long delay in the Daya Bay project, Lazard believes the per unit cost of nuclear energy would still be lower than coal.

Since peering into the future is like gazing into a crystal ball, planners should look back before they look ahead to see whether promised savings have been fulfilled in other countries.

Twelve years ago Harvard Business School lecturer Irvin Bupp and Massachusetts Institute of Technology (MIT) Centre for Policy Alternatives researcher Jean-Claude Derian did that.

They discovered that reactors commissioned in 1968 were yielding US\$430 per kw in 1974 - US\$250 per kw more than projected. They concluded that all these professional estimates were no better than "an educated guess."

Historical examples also cast doubt on the CLP and partner claim that the twin reactors at Daya Bay can reach 1,800 MWe capacity.

Harvard economist Charles Komanoff, after combing through statistics up to 1974, was shocked to find reactors generating on the average 60 per cent of their designated peak, far below the 70 to 80 per cent engineers had hoped for.

The highest consistent output was 77.2 per cent and the lowest a dismal 14 per cent.

The logic is, the lower the Daya Bay capacity, the less cost effective it is. At 70 per cent capacity, the Chinese station would churn out under 1,300 MWe.

Mr Komanoff writes in *Power Plant Performance - Nuclear and Coal Capacity Factors and Economics*: "The study projections of nuclear capacity factors significantly below those of coal, based on currently planned unit sizes, eliminate nuclear power's national cost advantage over coal."

"Coal is competitive with nuclear for new plants in the Northeast (US), and more economic elsewhere, even with the assumed 7.5 per cent nuclear capacity factor improvement."

"...Postponement would also facilitate choice of more reliable plants through further data base accumulation, capacity factor trend identification, and engineering improvement."

Whatever the ultimate Daya Bay effective cost, once a decision has been made and the groundwork begins, the Chinese will see to its completion. Hongkong Nuclear Investment Co (HKNIC) managing director Sir Jack Cater said: "China has shown that she is always on time with her major special projects and Daya Bay would not be an exception."

China, by not signing the Non-proliferation Treaty and getting into deep foreign debt (her traditional phobia), seems undaunted by the costs and unperturbed by the Hongkong uproar over Daya Bay, for its intention may be to learn from the French and one day to export the nuclear technology to developing countries.

The Chinese challenge in the scramble for the nuclear power customers who neither need nor can afford atomic energy could well be one of the unexpressed reasons behind the Daya Bay project.

That China may one day vie for customers, as France now does, could be in itself a guarantee that it would do its best to make Daya Bay safe, even if the station fails to be cost effective.

[Text]

THE public has asked whether Daya Bay can blow up. Sir Frank Layfield, who headed the team which compiled the eight-volume study on the Sizewell B Pressurised-Water Reactor (PWR) project in East Anglia, dismisses any chance of a nuclear explosion in a reactor.

Nuclear physicists agree the fission uranium in a PWR is not of high enough grade to spark an uncontrollable chain reaction.

They say the mobile neutrons from the 97 per cent uranium (U)-238 PWR fuel would fizzle out long before they could tear apart a PWR reactor. They also believe a mild burst of radioactivity from conventional uranium, while making a Geiger counter tick, does little immediate harm to the body.

But an ordinary explosion is certainly possible, as demonstrated by accidents at the graphite-moderated Chernobyl reactor and the Canadian Deuterium Uranium (Candu) Heavy Water plant in Pickering, Ontario, nearly 30 years ago in which, as usual, "human error" was cited.

Sir Frank conceded in 1985 that over a reactor lifetime, seepages were inevitable, but called the Central Electricity Generating Board (CEGB) contingency total evacuation plan for all civilians living within a 10-kilometre radius of an infected station, a panic response. He suggested moving only those living within 5 km of the failed plant.

He said Sizewell B would be less dangerous "in a normal situation" than a coal-fired plant and predicted several deaths during the station's seven-year construction time and 35-year life expectancy.

The deaths, he said, would be the results of workers falling off scaffolds and ladders. He said a nuclear plant was no more hazardous to build than most other major projects.

He estimated that one or two workers would die of direct radiation exposure at Sizewell B

through the 35 years of normal operation, an assessment strongly contested by the myriad of anti-nuclear groups.

Of the 3,000-page report, no section has been as avidly debated as the conclusions Sir Frank and associates have drawn for safety and radiation.

The chief assessor may have changed his mind since the Chernobyl accident near Kiev when radioactive particles, carried by the current, affected a wide swath from Finland to Britain, leading to a ban on produce - especially milk.

Indeed, the Chernobyl calamity, which prompted the Hongkong campaign against the Daya Bay station, has changed the perception of nuclear power. A Sizewell B Public Inquiry postscript is perhaps in order.

The pro-Daya Bay "Report to the Legislative Council on Safety and Tariff Arrangements", citing the International Atomic Energy Agency's (IAEA) defence of the PWR during a conference in Vienna last August, says: "It was noted that the Chernobyl plant was of a different design from those operating outside the Soviet Union."

Different design, true, but the deadly effect of radiation overdose does not vary whether the leaks are from a graphite or a light water moderated reactor.

Though less volatile than the lighter U-235, which comprises only two to three per cent PWR nuclear fuel, U-238, striving for a more stable nucleus, decomposes by squirting out two protons and neutrons to become the metal thorium-234. The powerful and swift ejection of the tiny particle is called alpha-emission.

T-234, still restive, expels an electron at high velocity called beta-emission.

The ongoing evolution of the element continues until the nucleus settles down to 82 protons and 124 neutrons - which is lead-206, an effective radiation absorbant.

Throughout the alpha-beta cycle, the protean nucleus releases an invisible energy similar to light called the gamma ray which, in a large dose, can kill all living things.

Together they are known as radiation and any material which gives off the force is considered radioactive.

Radiation arises from the ground, the air, the sea and the sky. Natural or background radiation varies from place to place, and in Hongkong, with its diverse terrain and industrial density, the range is extreme.

A Hongkong University physicist believes some local residents - especially those living on lime-rich soil and working in certain electronic factories - are exposed to seven times the normal radiation dose.

Nuclear power proponents argue that the Daya Bay station discharges would not add significantly to natural radiation.

Daya Bay is, they say, a safe distance away from Hongkong, and they cite the proximity of other atomic plants to major population centres. Indeed the Belgian city of Antwerp faces a reactor just across the river Schelde.

Some biologists and paleontologists now believe that species evolution might have been helped by radiation which can unscramble chromosomes and induce "benign" mutations.

Harvard biologist Professor Stephen Jay Gould theorises a massive shower of radiation might have wiped out the dinosaurs when a giant meteor ripped through the atmosphere and vaporised the ozone 70 million years ago.

Radiation affects individuals in different ways, though as a rule infants and fetuses are more vulnerable than adults.

Exposure can be measured by rad (radiation absorbed dose) and rem (Roentgen equivalent man) or Gy (gray) which is equal to 100 rads and Sv (sievert) which is equal to 100 rem.

Radioactivity is measured by bq (becquerel) and curie. A bq means an emission per second while a curie is 37 billion emissions a second. Some heavy elements are radioactive for millions of years and the rarest ones may die in a flash.

Most radiologists disagree at what exposure level is radiation harmful, though most believe a 400 rem dose is enough to kill

half the adult population and a much smaller dose can, in time, wreak havoc with the cells, leading to serious genetic damage and leukemia.

So far few cancer patients and their kin have won claims against utilities companies which operate nuclear stations. Proof that their ailments are caused by reactor radioactive leaks is often too tenuous to sustain in a civil suit.

China Light and Power (CLP), while hailing the Daya Bay safety standard, has not presented to the public a detailed study on radiation or an emergency evacuation plan. CEGB has, with a report on the "Radiological Limiting Design Basis Faults (LDBFs)", which in part reads:

"(We) calculated the following (radiation) doses to a one-year-old child:

a) dose to the thyroid (a large ductless gland at the front of the neck which regulates growth) from breathing contaminated air at the site fence;

b) dose to the whole body at the site fence due to direct radiation from a radioactive cloud...;

c) dose to the whole body at the nearest residence...;

d) dose to the thyroid from drinking milk produced by cows grazing close to the site."

Should there be a moderate radioactive seepage, CEGB suggested a prompt banning of dairy products and other produce, depending on the weather, in "a cigar-shaped area of about 20 sq km out to a maximum distance of 13 km from the site."

CEGB said it would first evacuate and shelter people living within a 2.4 km radius of Sizewell B, then do the same for those within five km and finally those within 10 km in an orderly operation that should take only hours and involve around 6,000 individuals.

After the area has been cleared, the Board would issue potassium iodate tablets to the evacuees to counter the radiation dose.

The National Radiological Protection Board (NRPB) suggested that the tablets should only be given to those exposed to more than 50 man-Sv.

CEGB said once the worst of the crisis was over, it would begin decontaminating the area by plowing the soil and destroying the radioactive crops. The resettling

of the inhabitants could take more time.

The weather can also exacerbate a severe accident and complicate the CEGB evacuation plan. Squalls that frequently buffet the Suffolk coast could blow airborne radiation down the Sandlings towards, say, the city of Ipswich 30 km away.

Sir Frank concludes: "In many weather conditions, even the worst design basis accidents would be expected to cause neither fatal nor non-fatal cancers in the United Kingdom."

"The effect of rain depends on where, when and how heavily it occurs."

Hongkong anti-nuclear apostles dread Daya Bay's proximity to the territory and the consequences of wind blowing radiation fallouts towards us, with no apparent escape route.

A *Ming Pao* newspaper article (January 9) reports: "According to Mr Lee Pun-ying, acting senior scientific officer of the Royal Observatory, the chances of northeasterly and east northeasterly winds blowing at the (Daya Bay) plant are respectively 2.4 and seven per cent, and that means less than one day out of every 10 days, comparing favourably with the one in every four days recorded at the Waglan Outpost."

"So judging from wind directions alone, the chance of radioactive fallout sordading to Hongkong is slimmer than earlier expected."

Unlike much of the relatively flat Suffolk area, Hongkong is hilly, which offers added protection against the spread of radiation.

CEGB, using a Westinghouse design fault "probabilistic" approach, estimated the chance of an accident not caused by design to be one in a million.

Guangdong Nuclear Power Joint Venture Co (GNPJVC) engineer, Mr Peter Littlewood, said the chance of a Daya Bay station disaster was similarly remote.

While CEGB may have glossed over the ecological consequences of a nuclear accident and CLP has yet to release a comprehensive study on the potential Daya Bay impact on the environment, the Consortium of Trade Unions and Local Authorities (TULA) has assembled a thorough report and made various suggestions.

TULA told the Inquiry that, if radiation fell over water and

infiltrated the food chain, the public should boycott fish from the heavily trawled North Sea. But as the wind disperses radiation over a wide region, its radioactivity weakens.

Because many of Hongkong's staples come from China, a ban on mainland produce would bring misery to both buyers and exporters. CLP, while ruling out the probability of a Daya Bay accident, is not known to have a compensation scheme policy to cover the damage from a nuclear disaster.

Last year when angry British farmers demanded reparations from the Soviet Union for the loss of sheep and dairy products, the Russian Embassy scoffed at the claims.

Right now the dearth of a valid international insurance policy on nuclear accidents leaves a country such as the Soviet Union unaccountable for the immediate and future consequences of a major catastrophe. The World Court at the Hague seems unperturbed by the legal lapse.

The Daya Bay case is most vexing and perplexing because, though a state is ultimately responsible for nuclear safety, the Chinese obligations to the future Special Administrative Region (SAR) are vague and it is not known whether the Basic Law Drafting Committee has solved or discussed this issue with Beijing.

Hongkong Nuclear Investment Co (HKNIC) director Mr Steven Poon said recently the firm's liability was limited. Though China has arranged insurance for Daya Bay, it is unlikely that any package can cover the gravest damages some of which - such as leukemia and deformities - may not manifest themselves for years.

TULA estimated a moderate airborne radiation disaster from Sizewell B "might cause a loss of annual agricultural production of 20 per cent in the United Kingdom and 100 per cent in the Netherlands under certain weather conditions."

"The cost to the United Kingdom could be over £1.5 billion in 1984 terms and to the Netherlands £4 billion."

The Soviet Union acknowledged last year that the Chernobyl catastrophe had cost billions of dollars; and had Moscow footed the bill for agricultural losses across Europe, the figure would have been significantly

higher. Besides, Soviet victims of Chernobyl are not likely to sue their government.

CEGB conceded that an accident would prompt farmers to dump at least 100 million litres of milk, equivalent to about a week's production in all Britain.

Civil litigations stemming from a nuclear plant catastrophe would burden the courts for years.

Dr G. Thompson, testifying on behalf of the Town and Country Planning Association (TCPA) criticised the NRPB's analysis that the evacuation procedure would be easy and the danger not so serious. He questioned how 7.5 million people affected by a major leakage under dreadful weather conditions could be evacuated, sheltered and fed potassium pills in two days.

He said a severe meltdown – the China Syndrome – of the Sizewell B reactor core would emit tons of highly radioactive substances into the immensely polluted North Sea and afflict Europe with a collective dose of 10,000 man-Sv.

A CEGB witness said a catastrophic accident that breached the containment system could send into the air radiation 10 to 20 times greater than a moderate leak. The Board estimated the possibility of that happening was one in 400 million.

NRPB told Sir Frank a "degraded core" accident seldom

caused any deaths and estimated the chance of 1,000 people dying right away from such a disaster as one in a trillion.

British Government radiologists said the chance of "fatal cancer and hereditary effects" caused by an accident was one in a million.

TULA dismissed the optimistic projection, saying even people in Chelmsford, about 100 km from Sizewell B, might get up to 500 man-Sv within a year of a relatively severe accident.

Sir Frank, while upbraiding CEGB and NRPB for producing convoluted data, rules in their favour: "I regard them (figures) as adequate for their purpose."

"There was no persuasive evidence that these estimates were significantly under-estimated overall; the related uncertainty is probably no more than an order of magnitude."

If CLP were to give Sir Frank its full report on safety and emergencies, it is likely that he would tepidly endorse the Daya Bay station even as he disagrees with the cost-saving forecasts.

The Sizewell B Public Inquiry report presented to the Secretary of State for Energy last December has not appeased the British anti-nuclear lobbyists and ecologists who insist that their advice had not been heeded and objections had not been seriously considered through the long hearings.

Upset

Sir Frank, a lawyer, antici-

pated their disappointment when the whole exercise began, knowing a decision one way or another would upset some people.

The primary aim of the study was to present to the British public a complex subject reviewed with a wide scope but without bias or partisan passions, though these invariably crept into – and livened up – the debates.

Such an appraisal, though highly recommended for the Daya Bay case, is not possible for Hongkong for several reasons.

However much Daya Bay will affect Hongkong for better or worse, the project is essentially a Chinese national undertaking. Had CLP not expressed interest in Daya Bay, it is conceivable that China would have built a nuclear station, albeit on a smaller scale, in southern Guangdong where electricity need far exceeds demand.

While Hongkong is industrially moderately advanced, it remains comparatively backward in the higher echelons of science and engineering. No local research team can muster the expertise – at £20 million (about HK\$240 million) and over two years – to analyse the often conflicting data.

Though half a million people signed a petition condemning the nuclear option and the feelings were genuine, no word or gesture could have budged China.

Exercise in British Democracy

Hong Kong SOUTH CHINA MORNING POST in English 7 Mar 87 p 14

[Editorial]

[Text]

THE Sizewell B Public Inquiry which lasted two years and cost HK\$240 million was more than a hearing into the pros and cons of a nuclear station. It was an exercise in British democracy at its finest. The Central Electricity Generating Board was required to open its books and defend its case; experts and laymen alike were given a say and their views were evaluated – and valued.

The inquiry's expense must

have galled the British Treasury, which reckoned rightly that whatever the outcome, the views of the pro-nuclear and anti-nuclear lobbyists would not be reconciled. But then pro and anti-nuclear sentiments are two opposite ideologies, two unwavering sets of convictions not unlike those held by the Darwinists and the creationists.

People seldom have their views changed quickly by public debate

but they can be enlightened gradually, and that was one of the things the inquiry had achieved.

Sir Frank realises that only time and the continued safety of nuclear stations around the world can convince sceptics that atomic power can benefit man and overcome his awe of a force introduced to the world through the destruction of Hiroshima.

The definitive report illustrates the complexities of nuclear power and its implications. It points out its inherent dangers and tremendous potential. Though it fails to please everyone, the report succeeded in illuminating many moral, scientific and even accounting issues.

In the end the fears expressed by the anti-nuclear apostles were shared by Sir Frank – but not to the point which turned him against the building of Sizewell B.

Would Sir Frank judge the case by China Light and the Chinese Government for nuclear power favourably if he were to head a hypothetical inquiry into the Daya Bay project? Certainly he would agree that a public forum on Daya Bay is essential for the Hongkong people who, unable to draw on the profound expertise of British science and engineering commanded by the Sizewell B inquiry, have the right to know all the facts on the nuclear option. The information so far disclosed is light-years away from the material presented to Sir Frank.

The Sizewell B report, while accepting grudgingly the Electricity Board argument for a pressurised-water reactor, exposes the fashionable fallacies espoused by both advocates and adversaries of

nuclear power and explores the facts until educated observations could be drawn.

It concluded that ultimately a nuclear station would marginally save money as fossil fuel supplies dwindled and prices rose; that it could be safe if the operators were careful; and that Britain should opt for Sizewell B for the sake of "national interest".

But the Committee also suggested that the Electricity Board reconsider its decommissioning cost estimates because it was the present generation's responsibility not to leave posterity the job of cleaning up an obsolete reactor.

No doubt the Hongkong people are willing to pay higher tariff rates to offset the future costs of decommissioning so as not to bequeath a terrible legacy to their children.

The Layfield Committee heard all sorts of arguments and ploughed through 55 tons of material. It discovered that the opponents of nuclear power were not modern day Luddites and the proponents were not diabolical and heartless profiteers. Both were concerned about the present and the future even as they bickered over the finer points of nuclear technology and cost saving projections.

The difference between Britain and Hongkong is that in the United Kingdom people were given the opportunity to express their opinions in a public forum and to require the Electricity Board to explain and defend its desire for a nuclear station. The other difference is that Britain has been a nuclear reactor operating country for more than 30 years while Hongkong is new to, and understandably nervous about, the atomic reality.

In Hongkong the Daya Bay plan was signed and sealed the moment China and the local utilities concern chose to go nuclear. That fact was never more apparent when the Hongkong Government declined, along with China Light, to divulge "sensitive secrets" even though the utilities company had compiled a five-volume Feasibility Study and the authorities had sponsored a survey by Lazard Brothers, both of which are kept from the public.

But information about the nuclear option, while sensitive, should never be kept secret. In Britain all the nuclear facts which are secret in Hongkong were discussed and dissected by an impartial panel and ultimately the press and the public.

Whereas the Sizewell B inquiry faced a deluge of information, Hongkong has had but a trickle which may in the end deepen suspicion and anxiety. No, the danger to Hongkong is not possible future leaks from the Daya Bay nuclear station but the attitude of a utilities company and the Government which seem to believe they alone are entitled to all the information when clearly it matters to everyone.

The Sizewell B inquiry is a lesson in the intricacies of the nuclear industry and, for Hongkong, in the freedom of information, which despite the present attempts of the Attorney General is not a luxury but a right.

If the Daya Bay controversy has roused public awareness on nuclear power and political rights, this may be the greatest gain to emerge from a project which could well be a drain on resources for years to come.

GOVERNMENT EFFORTS TO MONITOR DAYA BAY PLANT

Request to Beijing

Hong Kong HONGKONG STANDARD in English 24 Feb 87 p 1

[Article by Danny Lo and Andy Ho]

[Text]

THE Government has quietly asked Beijing to form an independent group with representatives from Hongkong to monitor the Daya Bay nuclear power plant, *The Standard* has learned.

The Political Adviser, Mr Richard Clift, has raised the matter with China through the Xinhua news agency's local office, sources told *The Standard* yesterday.

Another topic Mr Clift is pursuing with Beijing is how to open up channels for constant dialogue between Hongkong and China over the safety aspects of the nuclear project, the sources said.

The latter issue was also raised through Xinhua, which had promised to refer the matter to the relevant authorities in the Chinese central government.

These actions are part of efforts made by the newly established Government Committee for Contingency Planning to "oversee the preparation of a contingency plan, appropriate to Hongkong circumstances, to deal with the remote possibility of an accident at the Daya Bay Nuclear Power Station resulting in risks to the territory."

The Government's initiatives are in line with the recommendations of the Legislative Council nuclear fact-finding mission last September.

The Government Committee for Contingency Planning is an upgraded version of an inter-departmental working group on the subject.

The committee, headed by the Secretary for Economic Services, Mr John Yaxley, now comprises the secretaries for security, district administration, lands and works and municipal services, and the director of the Royal Observatory.

Other relevant government departments, such as the Attorney General's

office, the Information Services Department, the Water Supplies Department and the Environmental Protection Department, will be consulted along the way.

The Government is considering how best to channel the views of these departments into the main Planning Committee.

The committee will also take into account future recommendations from the United Kingdom Atomic Energy Authority at Harwell. The Authority is expected to submit a report on the topic to the Government by June.

Items topping the list are:

- **ARRANGING** talks with the Chinese authorities and the Guangdong Nuclear Power Joint Venture Company, which is responsible for the HK\$28.2 billion nuclear investment, on how to co-ordinate planning efforts.

- **ARRANGING** meetings between all government departments concerned to find out how individual departments could best contribute to the Daya Bay-related works.

- **REVIEWING** all existing nuclear power plant emergency plans.

- **CONTACTING** the United States Zion Nuclear Station to explore the possibility of sending Hongkong

observers to attend an emergency exercise of the plant scheduled for June.

- **KEEPING** the local partner of the project, the Hongkong Nuclear Investment Company, informed of the Government's efforts in developing a contingency plan.

Advisory Body Planned

Hong Kong HONGKONG STANDARD in English 4 Mar 87 p 1

[Article by Andy Ho]

[Text]

TOP local officials assigned to handle Daya Bay issues are considering how best to set up an independent body to advise the Government on topics related to nuclear energy.

The Government's latest initiative follows its recent request to Beijing to set up an independent panel, including representatives from Hongkong, to monitor Daya Bay.

Mr John Wilson, Principal Assistant Secretary for (Economic Services) Special Duties, told *The Standard* yesterday that no names have yet been suggested for the proposed committee.

The idea of creating a nuclear advisory committee is still in its formative stage, he said.

The proposal was first raised in the report of the Legislative Council's fact-finding missions on nuclear power last September, and has subsequently been taken up by the Government.

The Standard understands that the 116-group anti-nuclear front has received information from a Legco source that the Government has decided to confine the proposed committee to an internal co-ordinating body and to exclude members of the public.

In a session with the Omelco ad hoc group on Daya Bay two days ago, the Joint Conference for the Shelving of the Daya Bay Plant called for an advisory body with "representatives of the people" as members.

Mr Wilson yesterday categorically denied speculation that members of the public will not be included in the advisory board.

The Government, however, appears to be more keen on drawing people with expertise rather than community leaders to serve on the board.

"Our objective is to make the committee fairly broad-based with specialists, such as university experts in radiation, who can advise

us on various nuclear energy issues," Mr Wilson said.

He said there are many people, both here and abroad, who could offer the Government valuable advice in this regard.

Meanwhile, Mr Wilson told *The Standard* that the enquiry report of the proposed British Sizewell B nuclear power plant would have little bearing on the contingency planning studies now being prepared for the Hongkong Government by the United Kingdom's Atomic Energy Authority at Harwell.

The UK Government is expected to decide soon whether to approve the British Central Electricity Generating Board's plan to build an American-design pressurised water reactor (PWR) at Sizewell, Suffolk.

If approved, the Sizewell B facilities will be the first PWR unit on British soil. The Daya Bay PWR units, on the other hand, are of French origin.

Mr Wilson said he believed the Sizewell findings would in fact generally endorse those of Harwell's.

The inspector of the Sizewell public inquiry, Sir Frank Layfield, earlier informed the British Government that the Sizewell proposal was in line with British national interests.

"The Sizewell B unit is a bigger type of reactor. It is a four-looped 1,200 megawatt unit, whereas the two Daya Bay units are more or less standard 900 megawatt units," Mr Wilson explained.

He noted that factors such as the difficult site formation, civil engineering works and the particular loan arrangements for the Daya Bay plant should be taken into account, before comparisons are drawn on the costs for the two nuclear plants.

DAYA BAY STRUCTURAL FOUNDATION SET FOR AUGUST

Hong Kong HONGKONG STANDARD in English 21 Feb 87 p 3

[Article by Andy Ho]

[Text]

THE structural foundation for the main facility of the Daya Bay Nuclear Power Plant is set to be laid by August, pending the Chinese authorities' assessment of a preliminary report on the project's safety aspects.

The Guangdong Nuclear Power Joint Venture Company (GNPJVC) — responsible for the \$28.8 billion nuclear scheme — told *The Standard* yesterday its Partial Preliminary Safety Analysis Report has already been given to the Chinese State Council's nuclear licensing body.

The report was submitted to the Chinese National Nuclear Safety Administration (NNSA) on January 7, it said, exactly on schedule.

The document's approval will result in authorisation for the pouring of concrete for plant buildings and other work.

The GNPJVC said in a statement it expects the report to be approved by July following consultations between the company and the NNSA.

Chinese licensing procedures basically follow those laid down by the United Nation's International Atomic Energy Agency.

The company's next submission to the NNSA will be an Environmental Influence Report. Another four studies are required before a final permit is granted for the actual operation of the two Framatome 900-megawatt pressurised reactors.

The first Daya Bay unit is expected to come on-line in early 1991, and the second, one year later.

Meanwhile, a local anti-nuclear lobby yesterday urged the Government to set up a scheme to control the profit margin of the Hongkong Nuclear Investment Company, which holds a 25 percent share in the Daya Bay project.

The Joint Conference for the Shelving of the Daya Bay Nuclear Plant also criticised a Legislative Council working group that monitors Daya Bay developments for its "slow progress."

The head of the 116-group alliance, the Rev Fung Chi-wood, said: "The Onelco Ad Hoc Group on Daya Bay should meet more frequently and provide written replies to our questions."

"Until now the public has no idea of what the group has done and achieved."

The ad hoc Legco group, chaired by Councillor Wong Po-yan, will re-convene next Tuesday after a break of six days.

According to Councillor Jackie Chan, only about half of its 16 members have attended the group's four meetings since the group was formed in October.

At Tuesday's meeting they will discuss progress made by the Government and the HKNIC on recommendations made by Legco's nuclear fact-finding mission five months ago.

Also included in the agenda are the finance secretary's Daya Bay report to Legco and a submission by Rev Fung's anti-nuclear coalition.

A four-page article — by a Harvard University nuclear medical expert — that argues against "popular misconceptions" of nuclear energy safety is expected to be tabled for discussion.

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NO PROGRESS IN INSURANCE FOR NUCLEAR VICTIMS

Hong Kong HONGKONG STANDARD in English 9 Mar 87 p 1

[Article by Sheila Dawes and Handy Ho]

[Text]

CHINA'S absence from inter-government talks on nuclear accident insurance means Hongkong people are still in the dark about compensation arrangements in the event of an accident at the Daya Bay power plant.

The Standard understands that British Energy Department officials discussed nuclear accident insurance for Hongkong people at a current session of the Paris Convention on Third Parties Liabilities in the Field of Nuclear Energy.

But a department spokesman in London said that as China was not a party to the Paris Convention, decisions taken at the talks would not cover installations at Daya Bay or any other parts of China.

Provisions of the British Nuclear Installations Act, as they relate to the Paris Convention, have been extended to the territory through the Nuclear Installations (Hongkong) Orders of 1972 and 1983, he said.

The parties to the Convention are trying to raise the maximum liability of a nuclear power station operator, which is at present limited to US\$15 million special drawing rights of the International Monetary Fund system (roughly HK\$120 million).

However, compensation provisions for the Daya Bay plant, to be installed 30 km northeast of the densely populated Sha Tin and Tai Po areas, are still unknown.

The People's Insurance Company of China, the project's underwriter, is yet to announce its Daya Bay insurance scheme.

Mr Ding Denghuan, deputy manager of the company's Shenzhen branch, told *The Standard* last July that, based on 1983 preliminary calculations, the insurance premium for the plant would be US\$14 million (HK\$100 million).

He did not elaborate on how the amount would be raised or spell out other financial arrangements. Mr Ding said the exact terms would be announced later, but details are still not available.

The Paris talks now focus on the extent of damage and permissible unlimited liabilities. The amount that operators are liable to has not changed since 1982 but will be increased in the wake of the Soviet Union's Chernobyl disaster.

Operators of nuclear power plants in nations that sign the Paris Convention must provide insurance or other financial security.

Apart from Britain, there are 14 other parties to the Convention, including France and other major Western European countries.

They have agreed on a system of providing extra resources from public funds, in addition to the sums made available by the operator, to make it more certain that claims can be met in full.

If the contribution by the operator's state is not enough, all parties to the Convention will make up the difference.

China, on the other hand, is not affiliated to similar international co-operation mechanisms.

The Legislative Council's Daya Bay monitoring group asked the Hongkong Nuclear Investment Co (HKNIC) two weeks ago to explain the Daya Bay insurance scheme.

They are also concerned about the financial implications for the company as a partner in the Daya Bay joint venture.

The company, a full subsidiary of the local China Light and Power Co, has not yet replied to the councillors' request.

Accident liability was not mentioned in the censored version of the 1983 China Light Financial Memorandum on the Daya Bay project as it appeared in the Financial Secretary's report to the Legco last November.

SITE FOR FIRST PRC NUCLEAR POWER PLANT DEEMED UNSAFE

Hong Kong HONGKONG STANDARD in English 7 Mar 87 p 22

[Text]

A BEIJING geologic-al academic report, which was available in Hongkong only five days ago, suggests that the Qinshan site, about 100 km southwest of Shanghai, selected for the first Chinese-designed civil nuclear power station may be unsafe.

A local group of concerned scientists, who failed to get a copy of the document before the Legislative Council's Daya Bay debate last October, is checking whether it has any bearing on the Daya Bay project.

Chinese geologist Wang Jinxing concludes in his report that all the sites proposed then for power plant construction on the northern bank of Hangzhou Bay, including Qinshan, "could be faced with serious danger of unsafe geological phenomena and it should be avoided."

After processing the geological features of 1,521 locations in the region with the help of computers, the author suggests that new crustal structural movement not only exists there but is very active.

"In summary, we feel that the northern bank of Hangzhou Bay is a region of continual crustal subsidence and that its regional stability is not sufficiently ideal," he says.

The Qinshan facilities, with a power generating capacity of one-third of that of the Framatome-designed Daya Bay units, are expected to come on-line by 1989 — three years earlier than the date scheduled for first of the two Daya Bay units.

Some major components of the Qinshan 300-megawatt installation have already been moved to the site from Shanghai. Like Daya Bay, the Qinshan station will be equipped with a pressurised water reactor.

The Chinese-language journal, which first carried the article, was published in Beijing, and was unavailable in either local bookstores or the libraries of the territory's two universities. The author's background is not specified in the translated version.

The paper, *A Discussion of Regional Stability of Foundation of Nuclear Power Plants on the Northern Bank of Hangzhou Bay Based on Satellite Gravitational Data*, appeared in the July 15, 1985, issue of *Shuiwendizhi Gongcheng-dizhi (Hydrogeology and Engineering Geology)*.

A special point about the study is that Mr Wang applied both satellite gravitational measurements and historical geological records as basis for evaluating the stability of the regions shortlisted for the project.

The findings are contrary to those of an earlier

Chinese study. The August 1983 issue of the *Atomic Age*, also published in Beijing, maintained that the crust of the Qinshan site could stand possible earthquakes in the region.

Some enthusiastic engineers here were keen to find out how the results of Wang's study could be applied to the Daya Bay project. They intended to give some scientific input to the second Legco Daya Bay debate in light of the new findings.

They learnt that the American Foreign Broadcast Information Service has come up with an English translation of the paper, which in turn was reproduced by the National Technical Information Service of the US Department of Commerce.

The group then approached the American Consulate General for help to secure a copy of the report about two weeks before the lawmakers were to debate a motion to endorse the controversial Daya Bay nuclear plant, to be built only 30 km from Sha Tin and Taipo.

The Consulate General was not as helpful as expected, according to one who approached the American officials. The group then turned to the American Library for help, and the chief librarian there agreed to order a copy of the report for them.

The library told *The Standard* that the report finally arrived last Monday — four months late for the Legco debate.

The Deputy Chief Secretary, Mr Alan Scott, got a copy himself from the library the next day after the report was available here and engineers' group one day later.

Mr Scott told *The Standard* that he was reading the book, of which the article in question is only a part, for personal interests. He said his attention was drawn to the book as it was mentioned in another report which he has come across.

He noted that it was not unusual for him to check out documents from the American Library and the matter was not related to Daya Bay.

The Standard understands that the report has not been referred to other local officials involved in handling Daya Bay related issues.

Some members of the Hongkong Institution of Engineers (HKIE), however, are more keen to try to identify possible implications from the report on the Daya Bay project. More than 200 HKIE members have formed a nuclear energy study group and are holding discussion sessions on the topic regularly. Some of them are now reviewing the report.

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BRIEFS

NUCLEAR FUEL PROCESSING PLANT FUNDED--The Office of Atomic Energy for Peace has received funding in the 1987 budget year for a plan to construct a monazite processing plant to produce nuclear fuel. Secretary General Athon Pathummasut said that the office has received 1 million baht to design in detail a plant capable of producing 300 tons per year of uranium and thorium. He said the design work should take 1 year to complete. Construction is expected to take 2 years. Mr Athon said that Department of Mineral Resources statistics show that there are enough monazite reserves to provide up to 15 years of raw material for a plant with a 300 ton per year capacity. If the project is successful, the Ministry of Science, Technology, and Energy will proceed and may invite the private sector to participate in this project. [Text] [Bangkok Domestic Service in English 0000 GMT 7 Jan 87 BK] /12858

CSO: 5100/4309

CNEA'S CONSTANTINI ON ECONOMY, NUCLEAR PLANTS

PY170222 Buenos Aires NOTICIAS ARGENTINAS in Spanish 2105 GMT 15 Mar 87

[Text] Buenos Aires, 15 Mar (NA) — Alberto Constantini, chairman of the National Commission for Atomic Energy (CNEA), has said that the current economic policy is a monetarist policy. He said: "We are hoping for the promised stability, but no one is thinking of development." He added that he disagrees with Finance Secretary Mario Brodersohn "because he is not appropriating funds" to develop the nuclear program.

In an interview published by CLARIN, Constantini stated: "For 20 years I have been criticizing the monetarist policies implemented in the country. I believe that, if we continue to adopt this strategy, we will hold back the country's development."

Constantini said that "the monetarist policies are implemented in the country even by those who were originally adherents of Keynesianism." He said that the monetarist policies are implemented because the Chicago School has succeeded in making monetarism a type of culture for economists and businessmen."

The CNEA chairman, who is also chairman of the Argentine Center of Engineers (CAI), said that the goal of the CAI Advisory Business Council "is to debate topics that affect the companies and to seek solutions."

He rejected the idea that this advisory group was made up to support the "captains of industry," and said: "We gathered the most talented individuals because they represent the best intellectual ability of the business sector, not because of their political influence."

Constantini also said: "If we do not appropriate funds for research, we will become more underdeveloped than we are. Currently, there are certain countries in Latin America, such as Cuba, that have more important research institutes than we have."

Constantini said that "the businessmen believe that stability favors their activities. Of course it does, but stability alone will not solve our problems, we must grow also."

Concerning the construction of the fourth nuclear plant, Constantini said that "the FRG proposal is ahead," but the decision is not final yet, because "certain members of the CNEA favor another proposal."

He added that the FRG proposal includes "plant layout, technological and basic support, and complete autonomy to decide about construction projects in Argentina and abroad," and that "the other proposal is late, and we have received very little information on it."

Constantini said that the nuclear plant construction projects "are behind schedule because of delays and stoppages that occurred in 1981 and 1982," and that "the previous government is responsible for the delays in construction, which is some 5 years behind schedule."

He concluded by saying "I have 1,800 people working in the heavy-water project, and 800 working in the Atucha plant. All of them have threatened to halt the projects if they are not paid."

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CSO: 5100/2074

GOVERNMENT NOT TO SIGN NONPROLIFERATION TREATY

PY031929 Sao Paulo FOLHA DE SAO PAULO in Portuguese 2 Apr 87 p A8

[Text] Rex Nazareth, 49, president of the Brazilian National Commission for Nuclear Energy (CNEN), yesterday said Brazil will not sign the Nuclear Nonproliferation Treaty (NPT). Nazareth made this comment during a conference for the International Promotion of the Peaceful Use of Nuclear Energy which is being held in Geneva, Switzerland.

Nazareth supported the theory that the NPT is an instrument which favors only those countries that belong to the "Atomic Club" (United States, USSR, Germany [as published], the UK, France, the PRC and India). Last year these countries made over \$76 billion "from the deals which they want to keep exclusive." He explained that \$30 billion was received for the maintenance of the [number indistinct] reactors in operation throughout the world; the construction of 157 additional reactors yielded \$33 billion; and the sale of the fuel elements (enriched uranium) produced \$11 billion [figures as published].

"These world powers, under the pretext of containing the proliferation of nuclear devices for military use, try to prevent the technological development of their client-countries," Nazareth said. According to him, the possession of know-how also produces at least \$20 billion more a year from by-products of the nuclear process, such as the elementary phosphorous and pharmaceutically pure phosphoric acid for use in food (used in practically all canned foods).

Countries like Brazil and Argentina are trying to establish a front to overcome the objections of countries which control nuclear technology and have made the signing of the NPT a prerequisite for gaining access to certain technologies. "The safeguards imposed by the NPT imply placing our country and our industry under the control and supervision of our competitors, while they keep everything secret, from car models and computer chips to shoes and dresses fashions," Nazareth stated.

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CSO: 5100/2078

EXPERTS DISCUSS DEVELOPMENT OF NUCLEAR BOMB

PY231634 Sao Paulo FOLHA DE SAO PAULO in Portuguese 22 Mar 87 p A5

[By Tania Malheiros]

[Text] In an exclusive statement for FOLHA last week, General Haroldo Erichsen Fonseca, 63, Army science and technology secretary, said: "To manufacture atomic bombs is not our objective, but, if necessary, we will. With the knowledge we are gaining, obviously, we will be in a position to manufacture them. If we have resources, we can do it in 2 years time." However, according to Gen Fonseca, "Brazil does not need to build the bomb because currently it does not have any enemies."

According to the chief of the Army Technological Center (CTEX), an agency subordinated to the Army Science and Technology Secretariat, General Hernando Lomba Santoro, 60, "Brazil does not yet have the know-how to build atomic devices." However, he said that "with the acquisition of knowledge, the formation of research groups, and the installation of new laboratories to gain mastery over the atom, building the bomb will be possible, but not likely, because that would depend on the government's political decision, which has not yet been made."

In the opinion of writer, filmmaker, and producer of films on ecology, Federico Fullgraf, 36, "if Brazil is investing in a parallel nuclear program, the political decision to manufacture the bomb has already been made." Fullgraf said that it does not make sense for Brazil to have an atomic bomb "when the superpowers have more than 50." In his book "The Peaceful Atomic Bomb" due in May, Fullgraf says that he included articles written by Navy and Air Force officers, discussing the appropriate technological option and the probable cost of the bomb for Brazil.

Physicist Luiz Pinguelli Rosa, 45, of the Brazilian Physics Society (SBF), says that "Brazil is not in a position to build the bomb in the near future -- 2 or 3 years -- because the country has not yet mastered the technology to enrich and reprocess uranium to obtain the materials necessary to build the bomb. According to Pinguelli Rosa, "there is at Angra [site of Brazil's first nuclear plant] enough plutonium to build a bomb. The problem is that Brazil is not in a position to separate that plutonium, because it does not have the facilities to do so."

Fullgraf does not agree with Pinguelli Rosa. Fullgraf says that "Brazil is already reprocessing plutonium at the Energy and Nuclear Research Institute (IPEN) in Sao Paulo, an agency subordinated to the National Nuclear Energy Commission (CNEN). IPEN has received through the Brazilian-FRG agreement a "hot cell" to do that on a

laboratory scale. Fullgraf added that "there is an internationally organized connection among governments, research institutions, and scientists, which helped Brazil set up that infrastructure." This is why, he said, "there are areas in the IPEN that are off-limits even for inspectors from the International Atomic Energy Agency [IAEA]. Thus, it would be a mistake to think that the parallel program is only intended to do research on the fuel cycle."

For Pinguelli, Brazil already has the know-how to make the bomb. Its situation is identical to that of Argentina, and "both countries are engaged in a quiet race to build the bomb, although publicly they take a position against it." He said: "If the problem of enriching uranium and reprocessing it to obtain plutonium is solved, Brazil will be able to make the bomb in 3 to 5 years." Pinguelli does not refuse "to discuss the need for nuclear technology, including the fuel cycle," but he rejects the idea that "Brazil should manufacture a bomb." The physicist does not agree that this question "should be left in the hands of the military."

Pinguelli contends that the parallel nuclear program, which was initiated under the government of Joao Baptista Figueiredo, "is directed at developing nuclear technology for military purposes to the extent that it includes the development of a nuclear submarine and the fuel cycle." The physicist said that the SBF does not agree with the parallel program, because it entails the possibility for building an atomic bomb secretly, without any democratic control by society." He added that the SBF is open to discussing the possibility of constructing an atomic submarine, "provided it is not equipped with atomic warheads."

In the words of Pinguelli, the parallel program "is a legacy from the military dictatorship, because there are strong indications that during the government transition period a pact was struck to preserve the program." The physicist also challenged "the military to debate the merit of an atomic bomb." Pinguelli regrets that "political parties should not be discussing the parallel nuclear program, meaning the manufacture of the bomb -- an instrument of power for the military establishment."

While independent physicists stand against the continuation of the parallel nuclear program, which may lead to the manufacture of the atomic bomb, military authorities now publicly contend, in contrast to last year, that the program is needed.

Gen Santoro of the CTEX affirmed that "our opinion is that an independent nuclear program must be carried out so that, at the right time, research and laboratory teams will be in a position to participate in a national effort to attain self-sufficiency in this sector."

Gen Santoro added that "Brazil needs to be prepared to develop its own technology in the most complex fields because the more critical the area the less forthcoming will be the international cooperation, whether for political or commercial reasons." According to him, "it would be utopian to think that someone will help Brazil to master the atom without any self-interest." He explained that "to that effect there is a considerable exchange of information between the research and teaching institutions of the Army, Navy, and Aeronautics." He then observed: "I don't mean to say that we want to do everything, but we believe that we must know how to do it."

Army Science and Technology Secretary Gen Fonseca explained that "what the press calls the parallel program is nothing but an independent research program aimed at giving the country autonomy in the area of nuclear energy manipulation." Then he said: "Any dispassionate and reasonable person knows that Brazil is bent on attaining a high level of economic and technological development by the early 21st century. Brazil needs to gain expertise in the so-called nuclear fuel cycle because no foreign country will share this expertise."

According to Nuclebras' nuclear fuel Director David Neiva Simon, 55, the parallel program has "objectives, administrative systems, and a management structure completely different from those of Nuclebras, which are dedicated to the construction of nuclear plants, based on the broad industrial cooperation agreement between the FRG and Brazil." Simon pointed out that Nuclebras activities are controlled, overseen, and safeguarded by the IAEA; that its financial resources are budgeted by the federal government; and that its financing is in deutsche marks. He affirmed: "Nuclebras commits no transgressions because its objectives are very clear."

Simon noted, however, that, as the press has already reported, the Navy has chosen Nuclebras to develop, through NUCLEP (Nuclebras Heavy Equipment, Inc) in the municipality of Itaguaí (73 kilometers from Rio de Janeiro on the state's southern coast), the hulls of two conventional submarines, which strictly speaking form no part of the parallel nuclear program but is simply a point of tangential contact."

In Simon's opinion, Brazil may have been led to opt for a parallel nuclear program by "the insufficiencies or vulnerabilities" of the technological process included in the agreement with the FRG." He said that "as a Brazilian, I would like to see that parallel program defined more clearly." Fullgraf pointedly said: "The Armed Forces ought to make an option for peace, leaving that market of death. What is happening in Europe could serve as example for Latin America."

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CSO: 5100/2075

OFFICIAL DISCUSSES DEVELOPMENT OF NUCLEAR PROGRAM

PY252213 Sao Paulo FOLHA DE SAO PAULO in Portuguese 20 Mar 87 p A6

["Text" of interview with Rex Nazareth, president of the National Nuclear Energy Commission, by FOLHA correspondent Americo Chaer in Rio de Janeiro "during the week of 9-14 March"]

[Text] FOLHA: What is the Brazilian nuclear program?

Nazareth: This program is intended to prepare the country technologically so it can meet its current and future needs for nuclear energy in health, industry, agriculture, and electricity. On the one hand, we try to develop our own technology — this is the autonomous aspect of the program coordinated by the CNEN [National Nuclear Energy Commission] — and on the other hand, we try to absorb existing technology, particularly to generate electricity. The autonomous facet of the program is aimed at forming a "pool" of know-how, including fuel cycles.

FOLHA: What does know-how in fuel cycles mean?

Nazareth: The oil crisis taught us that the country's supply of energy must be based not only on the resources it possesses but also on the mastery of the technology needed to generate that energy. Brazil is rich in uranium, but it needs to master the technology for putting it to work. The cycle that begins with the identification of uranium and goes to its extraction and final application is mastered by few countries. These few countries set the policy to guarantee this oligopoly or, at least, to slow down the participation of other countries in it. The pretext is that this mineral also has military applications.

FOLHA: But won't Brazil make its own atomic bomb?

Nazareth: Brazil has a clear position. The objective of the nuclear program is not to manufacture atomic bombs. This can be seen in the consistency of our international positions. It can also be seen in the nonbelligerent nature of the Brazilian people and in the consistency of the program in that regard.

FOLHA: Isn't a country that does not have the bomb weaker than those that do?

Nazareth: Brazil will be weak if it does not achieve technological autonomy and if its society does not rally behind the fundamental interests that support its true independence and sovereignty. Brazil will not be weak without the bomb, just as Japan, the FRG, and Canada are not weak. These countries, however, have mastered technology.

FOLHA: Why do we have a parallel nuclear program if Brazil's interests are so clear?

Nazareth: Brazil has a parallel program to ensure an autonomous and independent development suited to the need of Brazilian society, not a development molded by what other countries think Brazil should be allowed to do. We are not going to relinquish our right to technological independence, nor will we allow ourselves to be converted into a colony for lack of technology.

FOLHA: Is the parallel program intended to hide from other countries what Brazil is doing?

Nazareth: No. The program is secret only in its developmental stage. Only in secrecy can we ensure our industrial development. No industrialized country has ever transferred sensitive technology to another country. Only technology for the construction of nuclear reactors is transferred. No one passes along any successfully tested technology. This is the way to keep a country that does not have technology as an indentured and permanent customer. When Brazil signed the agreement with the FRC, the Netherlands refused to transfer the technology for enriching uranium. Even the import of enriched uranium for research purposes was blocked. This is why we have to work alone. No one gives anything away. The world is an industrial market, subject to keen competition.

FOLHA: If the Brazilian program does not have belligerent objectives, how can the large number of military personnel involved in it be explained?

Nazareth: There is no important sector of technological development in which military technicians do not participate — either today or in the past. And this is not just true in Brazil. The fuel-alcohol program is an example; the Airspace Technological Center of the Air Force participated in it. The same thing happened in the computer and aeronautics industries. After all, there is no reason to keep highly trained technical groups away from the nuclear program, just to satisfy interests other than ours.

FOLHA: And the nuclear submarine?

Nazareth: It is only natural that the Navy, which is responsible for the security of 8,000 km of coastline, should be interested in nuclear-powered submarines — just as any other Navy in the world would be.

At this stage, the purpose is to effectively use nuclear energy, without actually having a nuclear submarine under construction. Of course, the complete mastery of the technology should permit us to build those submarines if Brazilian society deems it necessary. That the eventual mastery of this technology can open that future possibility must not keep us from trying to acquire it. This would be like vetoing the development of the steelmaking industry just because steel is used to make cannons and tanks. To fear nuclear technology because it can lead to the manufacture of bombs would be like blocking chemical or bacteriological research because it can lead to developing devices for chemical or bacteriological warfare.

FOLHA: And the risks? Won't the determined search for progress endanger the Country's survival?

Nazareth: By beginning its nuclear program later than other countries, Brazil benefitted from the accumulated international experience in nuclear safety. So, by incorporating that experience into our autonomous development, it will be possible, in the next century when our nuclear development reaches an industrial scale, to run lower risks than those posed by any other technology with which society normally coexists.

SARNEY TO VISIT CACHIMBO MILITARY BASE IN MAY

Sao Paulo FOLHA DE SAO PAULO in Portuguese 20 Mar 87 p A6

[Article by Dalton Moreira from the Vale do Paraiba]

[Excerpt] In response to an invitation from Air Force Minister Ocatvio Julio Moreira Lima, President Jose Sarney in early May will visit, for the third time the installations at the military base in Serra do Cachimbo (located in southern Para State, on the border with Mato Grosso State). In July 1986, under the coordination of the Aerospace Technology Center (CTA, of the Aeronautics Ministry), technical teams from the Mineral Resources Company of the Mines and Energy Ministry, were building underground installations (dome and wells) which were to be used for nuclear tests of several kinds and for the storage of nuclear wastes. In August 1986, FOLHA DE SAO PAULO published an exclusive report revealing the existence of this testing area. The objective of Sarney's trip is to show that this area will be used solely as a testing ground for conventional arms.

The president visited the Cachimbo military base for the first time in September 1986 (when he received a full report on the activities that the aeronautics sector was carrying out in the area). At that time he was accompanied by Gen Moreira Lima and by Admiral Jose Maria do Amaral, who was then chief of the Armed Forces Joint Staff (EMFA). Upon his return to Brasilia, Sarney ordered CTA technicians to seal the dome and wells. This decision was opposed by some military sectors that believed the project should be carried out in order to allow the country to have complete control over nuclear technology and in view of the investments that had already been made in this regard through the purchase of imported equipment. But with the support of General Moreira Lima, Sarney argued that the political cost of continuing this project would be very high.

In November 1986, the president returned to the Cachimbo military base accompanied by Moreira Lima to see if his orders had been fulfilled. The dome and wells had been sealed.

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CSO: 5100/2079

INDIA TO LOBBY IN U.S. AGAINST PAKISTAN BOMB

Madras THE HINDU in English 4 Mar 87 p 9

[Article by G. K. Reddy]

[Text]

NEW DELHI, March 3.

An all-out effort will be made by India during the next few weeks to lobby intensely in U. S. Congressional circles in Washington against the Reagan administration's unabashed bid to turn a blind eye to Pakistan's bomb programme, while seeking approval for the new \$4.2 billion military aid package for it.

Despite their reservations against India for its alleged pro-Soviet inclinations, there are some influential Senators who are opposed to the Pentagon's pro-Pakistan proclivities which continue to colour the U. S. policies towards them.

The U. S. is perhaps the only country in the world where a foreign government can openly campaign in Congressional circles against the actions of the administration without risking a breach of diplomatic relations. The West European democracies, for example, would not tolerate any such attempts by foreign embassies or lobbies to build up parliamentary pressures against the policies of their Governments.

Healthy tradition: The Government of India is determined to take full advantage of this healthy American tradition to carry on a vigorous campaign in Congressional circles against the blatant attempts of President Reagan and his advisers to bypass the Symington amendment and go ahead with the new military aid programme, without making any serious attempt to restrain Pakistan from crossing the nuclear threshold and upsetting the balance of power in the sub-continent. In the prevailing political atmosphere in Washington, it should not be too difficult to make a dent on Congressional opinion with an intelligent campaign backed by hard facts about Pakistan's bomb programme, without attempting to overstate the Indian case or allowing the Soviet factor to adversely affect the congressional attitudes by refraining in the next few weeks from any needlessly controver-

sial pronouncements.

The non-aligned coordination Bureau meeting, which is being held in Guyana next at the Foreign Ministers level, is going to be one such occasion when the U. S. will come in for a lot of bashing for its policies in central America which is expected to be the main theme at this conference. The Indian Foreign Minister, Mr. N. D. Tiwari, cannot afford to adopt an apologetic attitude towards U. S. interference in countries like Nicaragua to avoid causing unnecessary offence to American opinion, but the Indian criticism could be articulated with a greater degree of sophistication by taking advantage of the growing opposition within the U. S. itself against the actions of the Reagan administration.

One of the suggestions under consideration is that the Prime Minister, Mr. Rajiv Gandhi, should write personally to prominent U. S. Congressional leaders putting the Pak bomb threat in its proper perspective and let them draw their own conclusions about the grave consequences of the Reagan administration's policy of ignoring it. The possession of nuclear weapons by Pakistan, should not only nullify overnight any conventional arms superiority that India might possess as the largest country in South Asia, but also dramatically alter the balance of power in the region throwing the doors wide open for all-out super power rivalries.

The developments of such a situation would willy-nilly compel India to exercise the nuclear option, but the fact that both India and Pakistan possess the bomb would not by itself help to preserve the balance in such a situation. It needs to be explained to U. S. Congressional leaders with skill and imagination that even the two super powers cannot localise the possession of nuclear weapons by India and Pakistan; since China is bound to take sides to sharpen the confrontation, compelling both the U. S. and the Soviet Union to step in to secure their own political and strategic interests.

U.S. ROLE IN PAKISTAN NUCLEAR ISSUE VIEWED

BK251451 Delhi INDIAN EXPRESS in English 20 Mar 87 p 8

[Editorial: "Who Is Bluffing Whom?"]

[Text] In his Washington-Delhi telephonic press conference, the U.S. Deputy Assistant Secretary of State for Near East and South Asian Affairs, Mr Robert Peek, has reiterated his government's stand on Pakistan's nuclear capability. This overwhelming intelligence and other evidence that Pakistan, in the words of U.S. Senator John Glenn, has "all the components and means for assembling a working nuclear device", the Reagan administration has gone ahead with its request to Congress to waive the Symington amendment and approve a fresh \$4 billion military and economic aid package to that country. The Symington legislation forbids U.S. aid to any country which has developed or is developing nuclear weapons capability. However, Mr Reagan has certified, as he is required to do, that Pakistan is in neither category. As *The New York Times* put it, "For years, Pakistan has lied to the United States about not having a nuclear weapons programme, and for years the United States has bought the fiction."

But is it really a case of innocence on the part of the Reagan administration? The answer is an emphatic no. What it clearly looks like now is a case of the tail wagging the dog. Thanks to U.S. global ambitions and obsessions, thanks to its perennial tilt towards Pakistan vis-a-vis India, and thanks to the situation created by Soviet intervention in Afghanistan, Pakistan finds itself in a position where it can blackmail the United States into a posture of inaction or deception in regard to Pakistan's nuclear weapons plans and preparations. This does not mean, however, that the United States really cannot do anything about it. It can withhold the proposed fresh aid. This may not stop Pakistan in its nuclear tracks but it will certainly hurt it in terms of its economic and conventional arms requirements. Moreover, such an action would uphold the letter and spirit of the Symington legislation about nuclear weapons proliferation. Mr Reagan undoubtedly realises all this but evidently is in no mood to follow this honest and sane course. It is now for U.S. Congress and public opinion to act, and do so before it is too late.

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CSO: 5100/4733

REACTION TO REPORTED PAKISTAN BOMB TOLD

Foreign Ministry Spokesman, Nayar

Calcutta THE TELEGRAPH in English 3 Mar 87 p 1

[Text]

New Delhi, March 2: The disclosure by a top Pakistani nuclear scientist that his country has assembled an atomic bomb was yet another confirmation that Pakistan's nuclear programme had a weapons orientation, a spokesman of the external affairs ministry said here today.

The spokesman, reacting to reports in the press on the subject, expressed serious concern and said that India was keeping a constant watch on such developments having a bearing on the nation's security. Faced with a barrage of questions about the interview published in the London *Observer* yesterday confirming Pakistan's nuclear capability, the spokesman recalled that the external affairs minister, Mr N.D. Tiwari, had stated in Parliament that the government was concerned at the non-peaceful dimension of Pakistan's nuclear programme. "The report published yesterday is yet another confirmation that Pakistan's nuclear programme is weapons-oriented. This is viewed with serious concern," he said.

The spokesman replied in the negative when asked if India had sought any clarification from the Pakistan government about the report. He also categorically denied that India had in readiness nuclear weapons. Asked by a Pakistani correspondent when India would "reveal its bomb," the spokesman said: "I resent the insinuation that India has a bomb. I don't treat it

(the question) as a joke. Any report implying this is baseless, false and mischievous."

Meanwhile, the Pakistan embassy here today released a statement by Dr A.Q. Khan, the Pakistani nuclear scientist who was interviewed, as having said the words attributed to him were "mischievous, false, concocted and an attempt to malign Pakistan." Dr Khan said he had not given a formal interview to Mr Kuldip Nayar and his meeting with Mr Nayar was "coincidental and without prior arrangement."

Without disowning his claim that Pakistan has assembled a nuclear bomb, Dr Khan said the disclosure of the contents of the informal meetings and discussions with Mr Nayar "is a breach of trust and professionally unethical." He claimed that Pakistan's "modest" nuclear research and development programme was "solely for peaceful purposes" and was geared towards meeting the country's energy requirements.

However, in another statement released here Mr Kuldip Nayar maintained that Dr A.Q. Khan had given him an interview by appointment and appeared to be denying his comments under pressure.

The text of Mr Nayar's statement is as follows: "In the last 48 hours, A.Q. Khan has issued two statements, one to *The Observer*, London, saying that he had been quoted out of context, and the other through the Pakistan

government retracting most of what he said. I am glad that he has yet not denied the fact of meeting me.

"Let me put the record straight. Mr Khan met me on January 28 in Islamabad, and not one-and-a-half months ago. The appointment was fixed beforehand for 6.30 pm that day, and it lasted for more than one hour. I wish the reason for which he gave me the interview should have sustained his confidence in sticking to what he said. He is apparently under pressure but I cannot help him. I stand by the observations attributed to him. The rest is between him and his conscience, not mine."

Grave concern in both Houses

Members of both Houses of Parliament today expressed grave concern at reports that Pakistan had assembled an atomic bomb. Cutting across party lines, members wanted the government to come out with a statement on the issue and also spell out India's nuclear policy in view of the latest developments.

Khan Statement Text

Madras THE HINDU in English 3 Mar 87 p 9

[Text]

Following is the text of Dr. Qader Khan's statement as issued by the Pakistani Embassy:

"My attention has been drawn to an article in some newspapers by an Indian journalist, Mr. Kuldip Nayar, containing an alleged interview with me. The article is mischievous, false and concocted and is an attempt to malign Pakistan.

"I never gave Mr. Kuldip Nayar an interview and never used the words attributed to me.

"To put the record straight, a Pakistani friend of mine living in Islamabad came to my house some 1½ months ago to invite me to his marriage. He was accompanied by a person unknown to me and who was introduced as Mr. Nayar. Since my friend had come personally to deliver the invitation, I asked him to have tea.

"Kuldip Nayar casually asked my views about Pakistan's nuclear programme. I told him about Pakistan's policy, of its readiness to sign

a nuclear non-proliferation treaty simultaneously with India and to renounce the manufacture and use of nuclear weapons.

"In response to a question, I also told him that Pakistan's policy on this subject had been reflected, in unambiguous terms, more than once by our Prime Minister.

"As stated earlier, this coincidental meeting with Mr. Nayar was without prior arrangement. The disclosure of this informal meeting and discussions by Mr. Nayar is a breach of trust and professionally unethical. I regret to say that he has misused my hospitality and has, unfortunately, indulged in unfair and bad journalism."

"I want to reiterate that our modest nuclear research and development programme is solely for peaceful purposes and is geared towards meeting our energy requirements for a fast growing industry.

Timing of Interview Discussed

Bombay THE TIMES OF INDIA in English 8 Mar 87 p 8

[Editorial]

[Text]

There cannot be the slightest doubt that Dr. Abdel Qadir Khan, the top Pakistani scientist in charge of the uranium enrichment plant at Kahuta near Islamabad, has spoken to Mr. Kuldip Nayar to make the claim that his country has manufactured a nuclear bomb. Though Dr. Khan has said that he has been quoted out of context, he has not cared to offer a version of the talk which can admit of a different interpretation. And this is not the first time that the Pakistani scientist has spoken in this refrain. In the past also he has made the claim that Pakistan has acquired the capability to enrich uranium to over 90 per cent purity which is more than adequate to enable it to make the bomb. This raises two questions. First, whether the claim is justified? Second, why has Dr. Khan chosen to speak out once again? The answer to the first question cannot but be in the affirmative in view of scores of U.S. and other intelligence reports which have surfaced in the western press in recent years. Some Pakistanis, including Mr. I. H. Usmani, former chairman of the country's atomic energy commission, have disputed these reports; Mr. Usmani has so far as to suggest that the Kahuta plant is not capable of enriching uranium to even 2.7 per cent purity which is what has been achieved in western Europe. But these statements cannot be taken seriously in view of the overwhelming western intelligence reports to the contrary. So only the second question is relevant.

Dr. Khan is one of the most carefully guarded individuals in Pakistan. He cannot meet a journalist, not to speak of an Indian journalist, without prior clearance possibly by President Zia himself. He is also known to be personally close to the General. Even otherwise, it would be difficult to believe that a man who stole the blueprints from Urenco for the centrifuge plant at considerable risk to himself and masterminded the clandestine acquisition of equipment for Kahuta would do anything to embarrass his government; he is an intensely patriotic Pakistani. It follows that Dr. Khan's statement is part of a carefully worked out plan. Mr. Usmani's interview to *The Muslim* newspaper in Islamabad too could be part of that plan which must seek to protect the official line that Pakistan is not interested in, and not capable of, producing nuclear weapons. It follows that we should be cautious in accepting at its face value the view that contradictory claims by Dr. Khan and Mr. Usmani point to an internal struggle in the Pakistani scientific community. Rivalries are common in scientific establishments all over the world. Dr. Khan and Mr. Usmani could also be pulling in different directions. But that is by no means certain in view of the complicated game the Pakistanis appear to be engaged in.

On the face of it, Dr. Khan's interview is most ill-timed. The U S Congress has begun its hearings on the administration's proposal to provide Pakistan military-economic assistance totalling \$ 4.2 billion in the next six years. It can, therefore, be argued that Dr. Khan has played into the hands of the opponents of U S aid for Pakistan who would use his claim to dispute the Reagan government's certificate that Islamabad does not possess a nuclear weapons capability. But it is possible to turn this plea around and argue that U S aid would be assured if Washington is convinced that Pakistan would otherwise unveil its nuclear weapons programme. Such a view would not be too far-fetched. For reasons of its own, the Reagan administration has been keen that Pakistan does not hold a nuclear test and thus bring its programme into the open. This is, of course, not the only, or even the main, reason why Washington has been so generous in its military assistance to Islamabad. Those other reasons are well known — the U S determination to arm the Afghan Mujahideen so that the Soviet Union can be bled in Afghanistan and the role Pakistan plays in America's Gulf strategy for the protection of pro-Western regimes, especially the Saudi one. But to prevent Pakistan from going public with its nuclear weapons programme has been a U.S. priority. Dr. Khan could be playing on American nerves. The warning cannot possibly be missed in Washington.

There is another possibility which should be kept in view in discussing Dr. Khan's, and indeed the Pakistan government's, motives. There has been a spate of reports on the Pakistani nuclear weapons programme, one of them suggesting that Israel has repeatedly approached India to bomb the Kahuta facilities out of existence. President Zia and his aides could convince themselves that the pro-Israeli lobby was waging a psychological war on them and they could well decide to hurl defiance at their detractors. And what better way to do so than to put on display their ace card,

Dr. Khan. The timing of the interview could be interesting from yet another angle. If the Indian build-up on the western border casts some doubt on the worth of the Zia regime in the Pakistani people's eyes, Dr. Khan's claim could be intended to reassure them that Islamabad was capable of looking after the country's security. In plain terms, the interview might well be an extension of President Zia's cricket diplomacy. The timing apart, Dr. Khan has given the regime a boost which it apparently needs in the context of the challenge Benazir Bhutto has come to pose and the recent ethnic riots in Karachi and other Pakistani cities.

Pressure on India

Calcutta THE STATESMAN in English 4 Mar 87 p 8

[Editorial]

[Text]

To observers beyond the sub-continent, the ups and downs of Indo-Pakistani relations must often seem like a delightful yo-yo, but now the nuclear threat takes the fun out of the game. On the face of it though, play goes on, both at the Foreign Secretaries' level and on the cricket field. Even after Dr Abdul Qadar Khan's sensational disclosures, Mr Abdul Sattar and Mr Alfred Gonsalves signed an agreement on defusing tension along the border. This virtually completes the de-escalation process begun last month in New Delhi, while allaying Islamabad's fears about Operation Brass-tacks—which is to continue as scheduled—and with regard to the sealing of the Punjab border by Indian troops. And, while New Delhi ensured that President Zia did not extract the kind of political mileage he might have expected to from his Jalpur trio, the visit undoubtedly helped to reduce war psychosis at the popular level. To that extent, Dr Qadar Khan's disclosures about Pakistan's nuclear prowess could not have been worse timed. From his highly convoluted semi-denials it would seem that Dr Khan did indeed make most of the remarks at-

tributed to him. In fact, by complaining of unethical practice, and of a "private" conversation being reproduced, Dr Khan in effect admits that the report is accurate in substance.

However, it has to be admitted that the Pakistani scientist's claims are no revelation, although they confirm many earlier suspicions. Reports in the American Press suggested last November that Islamabad was only "two screw-driver turns" away from possessing a full-fledged nuclear bomb, and had detonated a triggering device some time between September 18 and September 21. Dr Khan has now confirmed the story, adding that Pakistan is capable of enriching uranium to 93.5 per cent which makes it weapons grade. He has even gone on to boast that Pakistani scientists have achieved in seven years what their Indian counterparts took 12 to do, and that his country's plutonium reprocessing capabilities are way ahead of India's. By describing American media accounts of Pakistan's nuclear accomplishments as "correct", Dr Khan has thus only reaffirmed what was already widely suspected.

The astonishing aspect of the disclosure, however, is Dr Khan's assertion that the CIA knows about all this. President Reagan's decision to seek a further six-year waiver on the Symington Agreement assumes a sinister dimension in this context. In other words, the Reagan Administration, which ritually denounces nuclear proliferation in passionate language, is apparently prepared to ignore information gathered by its own espionage agencies in order to assist the conventional militarization of a nuclear Pakistan. With President Reagan heading over backwards to please General Zia the much-maligned Nixon-Kissinger "tilt" of the early seventies now seems almost an innocent gesture. That Indo-U.S. relations will suffer a sharp setback in the light of the latest evidence of Washington's hypocrisy hardly bears emphasizing. At home, more and more people are bound to ask what further proof the Government requires before reviewing its nuclear policy. If Pakistan can make a bomb and claim it is for peaceful purposes only, India too may be under pressure to manufacture a bomb, even if only for display.

GANDHI TO MEET PAKISTAN'S NUCLEAR 'THREAT'

BK241621 Delhi Domestic Service in English 1530 GMT 24 Mar 87

[Text] The prime minister has reiterated that India would make an appropriate response to Pakistan's reported move to acquire nuclear weapons. Addressing a news conference in Sriharikota today Mr Rajiv Gandhi said that he intends meeting President Zia's threat and the Indian people will not be found wanting. Mr Gandhi declined to elaborate. He said he had made an observation on India's response to Pakistan's nuclear move in Parliament earlier.

On Sri Lanka, Mr Gandhi said India's stand is firm and he told President Jayewardene that any settlement to the ethnic problems should be just to the Tamils. He said he believes that Sri Lanka is still holding on to the December 19 proposal to resolve the issue.

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CSO: 5100/4731

HINDU SAYS 'NUCLEAR OPTION' NOT SIGNED AWAY

BK181523 Delhi THE HINDU in English 9 Mar 87 p 8

[Editorial: "Implications of Pak. Nuclear Capability"]

[Text] The uninhibited and boastful remarks Pakistan's top nuclear scientist, Dr Abdul Qadir Khan, made recently to an Indian journalist, Mr Kuldip Nayyar, have given a fresh content and edge to the disturbing knowledge that has been with India for some eight years: that Pakistan, under a military dictatorship, has actively pursued a nuclear weapons option and it must now, for all practical purposes, be counted as a country with a nuclear weapons capability, even status. No light has been shed on whether Pakistan has been able to develop a bomb configuration or design, complete with a triggering device, in a militarily deliverable form, but the assumption must be that after the enrichment breakthrough, the ability to fabricate some kind of crudely deliverable nuclear weapon should not be underestimated by Indian policymakers. The controversy set off by the remarks of the man behind the Kahuta uranium enrichment facility has posed at least three major questions or issues originating from the no longer clandestine venture. The first concerns the objective status of the Pakistani nuclear programme. According to Dr Khan, the Kahuta plant became "fully operational" by the beginning of 1979: "what the CIA has been saying about our possessing the bomb is correct"; Pakistan has been able to upgrade its uranium enrichment to a 90 per cent level, which is clearly weapons grade; and no testing of the nuclear explosive or weapon is deemed necessary since "the testing does not have to be on the ground" and "can be done in a laboratory, through a simulator." These bits of specific information given to the Indian journalist (whether "carelessly" or by design, is hardly important in this case) are in line with the expert evaluations made in the United States, India, and elsewhere. They underline the dangerous military character of the thrust of a supposedly peaceful atomic energy programme, which has no operational power side worth speaking about. With two centrifuge enrichment plants in operation, including an experimental one, this programme obviously has enough explosive grade or weapon grade material to put together one device or more per year; the parallel reprocessing route tried out at Chashma has evidently not been as successful but clearly represents some kind of future menace. The nature of the threat Pakistan sees itself as posing to India is helpfully summarised by Dr Khan thus: "Nobody can undo Pakistan or take us for granted. We are here to stay and let it be clear that we shall use the bomb if our

existence is threatened." Let there, then, be no doubt about either the objective, or the subjectively perceived, nature of the Kahuta uranium enrichment venture and the lesser known endeavour to produce plutonium and reprocess it. This reconfirmed knowledge leads straight to the point that the Prime Minister, Mr Rajiv Gandhi, has emphasised in Parliament: That the United States has not been involved in any process of restraining Pakistan in its nuclear ambitions, but has actually gone along with it, under the circumstances, by coming up with a dangerous armaments programme that increases the security pressure and burden on India. "America knows it", boasted Dr Khan and surely this has been the case since at least early 1979 (and almost certainly earlier than that). It was no coincidence that the Carter administration, sensing the Congressional and public mood, went along with the sober political effort that resulted in the Symington amendment of May 1979. It suspended military as well as economic aid to Pakistan and squarely blamed this on the character of that country's nuclear energy activity; the fact that economic aid to India was not suspended (despite the Peaceful Nuclear Explosion of May 1974) demonstrated that the United States could see a substantive difference between the two programmes. But, following the Afghanistan developments beginning in 1979, the Carter administration initially, and then the Reagan administration, brought about a new military relationship with the anti-democratic Pakistani regime which has put a great deal of pressure on India's security. An unprecedented military and economic aid programme — inducting into the South Asian region a qualitatively new generation of weaponry spearheaded by the F-16s — was put in place. Indeed, Pakistan, despite having become a formal member of the Nonaligned Movement, is being treated by the U.S. as one of its military allies. Specifically, the Reagan administration claimed that the sophisticated conventional weapon supply to Pakistan was required to "dampen" the client's nuclear appetite, or to provide it with a big enough incentive not to go the nuclear weapons route. That has, notoriously, failed to happen and meanwhile the U.S.-Pakistan military liaison has progressed to the stage of joint military exercises, intelligence sharing and so on (to go by the information made available during the current Congressional hearings connected with the proposal for a new six-year \$4.2 billion aid package for Pakistan). The current attitude of the Reagan administration is quite clear: responding to the nonproliferation specialist, Sen-

ator John Glenn's letter demanding a suspension of U.S. military aid to Pakistan, Mr Robert Peck, a senior State Department official, confessed that there was no question of the U.S. obtaining "reliable assurances" from Pakistan about its nuclear venture and appealed to Congress not to do anything to impair U.S. aid to that country through "public confrontations" or "legislative ultimatums." Thus has the fig leaf has been removed from the nature of the American policy and it is up to India, its leaders, and its people, to draw realistic conclusions from the latest exposures.

The third issue relates to the immediate implications of the Pakistani nuclear menace, and collusive U.S. strategic policy, for India's atomic energy programme and policy. While a very watchful eye has to be kept on the strategic security implications, the advantage is that the long established nuclear policy framework does provide the elements of soundness, restraint, specialised resources, and opened flexibility demanded by a very complicated situation. Sovereign India, which is correctly opposed to the discriminatory principle underpinning the Non-Proliferation Treaty and regime, has not acceded to this multilateral arrangement; there is no question today — if there ever was — of caving in to the pressures, just because the Pakistani military regime asks or rather challenges India to sign away (through electing one among a set of discriminatory non-proliferation propositions) its "nuclear option." With the Kahuta uranium enrichment plant fully operational, what is the intention and meaning of Gen Ziaul Haq's recurrent call to India to agree to a nuclear weapons free zone in South Asia, or to a mutual "inspection" of facilities? Whose game must he be understood to be playing? Even as India — for reasons of international politics as well as its own security — keeps its nuclear option live and must be expected to watch closely the precise moves by Pakistan at this sensitive juncture, it very soberly keeps in place the self-imposed restraint on the character of its nuclear energy activity: which is to say that, while there is no doubt that India is a nuclear explosives power (after May 1974) and a power with the full capability to produce a nuclear weapon (if such a security and political requirement were imposed on it), it is at present committed to the exclusively peaceful use of nuclear energy and against any military application. But the sovereign right to decide on the nuclear option, in response to the overall circumstances, has not — it must be emphasised — been signed away.

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CSO: 5100/4731

'NO OPTION' BUT 'TO MATCH' PAKISTAN'S NUCLEAR ABILITY

BK141119 Delhi INDIAN EXPRESS in English 6 Mar 87 p 8

[Editorial: "Talk and Prepare"]

[Text] The removal of Mr Mushahid Hussain, the young and fearless journalist, from the editorship of the *Muslim* must convince even the Americans that Dr Abdul Qadir Khan had said all that Mr Kuldip Nayyar had reported him as saying. Mr Hussain was with Mr Nayyar when he talked to Dr Khan in January. As Dr Khan prevaricated, Mr Hussain confirmed the substance of the interview in his editorial on Tuesday. As a consequence, he was attacked with a vehemence, a savagery that only those who live under dictatorships, can recognise. Condemned in the assembly as a "traitor" and much else, he has had to "resign". Such is the price for speaking truth.

But the truth is, Dr Khan clearly said that Pakistan already has the atomic bomb and unless his statement was a red rag aimed at provoking India, we must assume the worst, that Pakistan is on its way to building a nuclear arsenal. In response we must talk as well as prepare. If the superpowers, which have stockpiled enough nuclear and more lethal weapons to destroy the world many times over, are talking to see whether there is any way to reverse the race to mutual annihilation, countries like India and Pakistan have even greater reason to search, and to go on searching, for any possible way that would enable them to turn back. They are, after all, just setting out on this route.

India must also take up Dr Khan's disclosures in every available international forum. This will further document the duplicity of some governments and, indeed, the legislatures of countries like the U.S. which tout laws saying one thing while they themselves underwrite steps that fly in the opposite direction. Taking the matter up in these fora will give those governments yet another opportunity even at this penultimate stage to do what they can or will to persuade Pakistan to see reason.

An Indian decision to build a bomb cannot be built around a statement alone, even if it is from the head of Pakistan's nuclear programme. Such a decision will have to be based on all available indications of the true state of affairs. But the government must unambiguously announce that faced with what Pakistan is doing, and what its allies are not doing, India will have no option but to match Pakistan's nuclear capability.

500 MEGAWATT REACTOR DESIGN IN ADVANCED STAGE

BK190239 Delhi THE PATRIOT in English 13 Mar 87 p 5

[From the "Rajya Sabha Answers" column]

[Excerpt] India's first 500 mw nuclear power reactor is likely to be commissioned during 1995-96, the Rajya Sabha was informed on Thursday, report agencies.

Work on design and engineering of the 500 mw reactor is now at an advanced stage, Minister of State for Atomic Energy K.R. Narayanan said in a written answer.

The 15-year nuclear power profile prepared by the Atomic Energy Department envisaged setting up of 12 units of 235 mw and 10 units of 500 mw capacity pressurised heavy water reactors.

One of the main constraints is the availability of investment resources to convert the nuclear power board into a corporation, the minister said.

The Government denied that there was a proposal with the Council of Scientific and Industrial Research (CSIR) to import paper from Japan for the purpose of making portraits of Indian scientists.

The minister told Mr S. S. Vaghela during question hour that the director general of the CSIR during a meeting with the Prime Minister had discussed the proposed of making portraits of scientists like C.V. Raman and J.C. Bose with a view to promoting science and scientific development. But there was no proposal to import paper from Japan for this purpose, he added.

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CSO: 5100/4731

INDIA

BRIEFS

U.S.-PAKISTANI NUCLEAR GOALS DISCUSSION DENIED--The government today denied that there is any proposal to send a high-powered delegation to the United States to urge the Reagan administration and Congress to dissuade Pakistan from pursuing its nuclear program. An official spokesman said in New Delhi that reports to this effect in a section of the press are factually incorrect. He said a member made a suggestion to this effect in the Rajya Sabha on Tuesday and the minister of state for external affairs, Mr Natwar Singh, had only said that he will place this proposal before the government. [Text] [Delhi Domestic Service in English 1530 GMT 19 Mar 87 BK] /9274

THORIUM PLANT PROPOSED FOR ORISSA--The minister of state for science and technology, K. R. Narayanan, said in the Lok Sabha that government proposes to set up a thorium plant with an annual capacity of 150 metric tons of thorium nitrate in Orissa. It is expected to be completed in 2 years. He also said a fast reactor reprocessing plant is to be set up at Kalpakkam which will be ready by about 1993. [Text] [Delhi Domestic Service in English 1230 GMT 25 Mar 87 BK] /9274

CSO: 5100/4733

AFP REPORTS 'NUCLEAR MATTER' STOCKPILED

AU241731 Paris AFP in English 1725 GMT 24 Mar 87

[Text] Geneva, March 24 (AFP) — "Nuclear matter," under control of the International Atomic Energy Agency, was recently stockpiled by Iran on the site of the Bushehr nuclear power plant, announced 'Ali Soltanieh, [spelling as received] head of the Iranian delegation to the United Nations Conference on Peaceful Atomic Use Tuesday in Geneva.

"We gave advanced warning to the IAEA [as received] in Vienna and furnish a confidential description of the nature of these materials," Mr Soltanieh added.

According to Mr Soltanieh, "The conference must take all necessary steps to prevent a military strike against this target, which could provoke the same radioactive consequences as the accident in the Soviet nuclear power plant at Chernobyl."

Mr Soltanieh also elaborated on four previous attacks against the Bushehr plant, one on March 24, 1984, two on February 12, 1985, and one on July 12, 1986.

Construction of the Bushehr nuclear power plant began before the Islamic Revolution under the auspices of the West German firm KWU. The plant was to have had two water pressurized reactors of 1200 mw each. It never was finished. One reactor is 80-percent complete.

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CSO: 5100/4731

MA'ARIV: AUTHORS QUESTION NUCLEAR PROGRAM

TA221310 Tel Aviv MA'ARIV in Hebrew 22 Mar 87 p 10

[Commentary by 'Ami Dor-on and Eli Teicher: "Prey to the Nuclear King," the writers are the authors of the book "Nobody Will Survive Us — The Story of the Israeli Atomic Bomb," which was banned for publication by the military censor]

[Text] About a million people throughout the world are currently engaged in espionage and surveillance activities, in one way or another. It is estimated in "professional circles" that some \$60 billion is spent every year in this area. In the international intelligence community — both in the East and the West — Israel's nuclear capability is considered 1 of the 100 most important intelligence targets in the world. A country that may be a nuclear superpower is a first-rate intelligence issue. This being the case, it may be said with a considerable measure of certainty that "moles" have been and are still planted in areas that intelligence organizations suspect of having potential nuclear capability. Just as Israel had Pollard in the United States, it is reasonable and plausible to believe the United States had a "Pollard" here.

Espionage does not only involve flesh-and-blood human beings in the field. A complex system of espionage satellites, sophisticated monitoring installations, spooks and moles, scientific conventions, and academic exchanges exists around the world. Nothing is kept secret from this "system." Nowadays, a person in the Middle East cannot even burp without somebody, somewhere, monitoring him.

Which brings us to the logical conclusion that if anyone in the Israeli intelligence community believes Mordechai Vanunu's disclosures to the world were news or that the big and rich intelligence services have no idea what is going on in the nuclear sphere in Israel, he is a real nitwit who should be fired from his job because he will be the brain behind the next fiasco.

According to foreign publications, Israel has invested vast sums in the establishment and development of the nuclear research center in Dimona. If nuclear weapons are indeed produced in Dimona, as foreign sources have been insisting for some years, this means Israel needs "vehicles" to enable these weapons to reach their intended targets. There is a bottomless pit for you.

Such research and prodigious efforts in the world tend to expand "dark" whose thirst cannot be

quenched. He who produces an atomic bomb wants to attain a hydrogen bomb, then a neutron bomb. Meanwhile, billions keep slipping between the fingers. So, if this is the case all over the world, why should we think it is different in Israel?

Has the astronomical investment in Dimona done any good? Has Israel slashed even one helicopter, tank, or armored-personnel carrier from its Army? On the contrary: Israel is increasing its investments in conventional weapons, including the development of a highly-praised jet fighter, and it is confidently on its way to becoming a huge arsenal from Metulla to Eilat and, as a result, going into total bankruptcy and impoverishment.

Israel's economic situation is on the brink of an abyss. Teachers are dismissed, schools are closed, teaching hours are reduced, and a new generation of morons is being raised. Next decade's teachers will reflect the current drop in education levels and illiteracy will blossom. Israel's health services are crumbling and very soon medical treatment will be a luxury only affordable by the rich and those in high places.

Agriculture is collapsing, kibbutzim are mired in debt, moshavim are going into receivership, senior citizens and pensioners suffer deprivation while the threat to cut their pensions hovers over their heads, and the circle of poverty keeps spiraling. Crime is on the rise both because the police force has been cut and because poverty is a hotbed for crime. Israelis are getting fed up with their country and immigration has been decreasing while emigration has been increasing.

Only one king apparently gets all he needs, as if he were living on another planet, and that is the king of defense. So, slowly but surely, we are turning from a country that may have the bomb into "maybe a bomb" that has a country.

Any Israeli who thinks "we can believe in somebody" on the

decision for a nuclear research center is deluding himself. If there is any lesson to be learned from the Yom Kippur War, it is that we should doubt the wisdom of leaders before whose nonexistent genius we knelt prior to that terrible conflict and whom we later saw in their weakness. Each of us should today tell himself: I am as clever as the "holy trinity" of Shamir-Peres-Rabin that is currently running the country from its inner sanctums. If we sit idly by and let things deteriorate, this time all of us will be guilty.

Those who wanted to produce a nuclear option in Israel believed this would obviate the need for a large army. Under cover of the nuclear deterrence umbrella, so they believed, Israel would be able to get by with a small, professional, and inexpensive army which would carry out daily security missions. However, plans are one thing and reality is something altogether different. No means are spared when it comes to developing the nuclear option. On the contrary, we currently maintain both an outrageously expensive nuclear infrastructure and an outrageously expensive and enormous Army. And, the maintenance of both is what closes down schools and hospitals, dries out agricultural fields, and makes illiteracy, malaise, and poverty thrive.

David Ben-Gurion would have been shocked to learn that his vision of building a nuclear infrastructure to prevent a second holocaust from befalling the Jewish people is indirectly leading to a different kind of catastrophe, of a tiny country committing economic suicide because of its decision to develop an additional military power.

This is the time for a public debate on fundamental questions of security regarding the nuclear option as opposed to, or along with, conventional weapons. This "sacred cow" should also be probed. It has been left out to pasture for a long time and has grown fat beyond all proportions.

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CSO: 5100/4519

JUNEJC CLAIMS NO INTENTION TO MAKE NUCLEAR BOMB

BK041656 Karachi Domestic Service in Urdu 1500 GMT 4 Apr 87

[Excerpt] Prime Minister Mohammad Khan Junejo has said Pakistan neither has the capability to make an atomic bomb, nor does it have the intention to make and possess the resources for making one.

In an interview with London Weekend Television, he said Pakistan will improve its atomic technology to the extent of overcoming energy problems and fulfilling its needs.

The prime minister said as far as the enrichment of uranium is concerned Pakistan has acquired this capability but only for peaceful purposes.

When asked about the reason for everyone's talking about Pakistan's capability to make an atomic bomb and its interest in making an atomic bomb, Mr Mohammad Khan Junejo said if anybody has any concern about an atomic bomb in this region why does he not ask whether India has made an atomic bomb or not; or whether India has this capacity.

On the danger of any attack on Pakistan's atomic installations by India or Israel, the prime minister said Pakistan is not concerned about this.

In this connection he said in the last 6 years Pakistan has had extremely good relations with the United States. The alleged problem of an atomic bomb does not have any connection with the U.S. package aid agreement.

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CSO: 5100/4737

CHANGE IN ARMY LEADERSHIP SPARKS CONCERN

BK251312 Delhi THE HINDU in English 19 Mar 87 p 9

[From G.K. Reddy]

[Text] New Delhi, March 18.

The appointment of Gen. Akhtar Abdul Rahman Khan, Chief of Military Intelligence, as the next Chairman of the Pakistan Joint Chiefs of Staff Committee, is viewed with some concern in Delhi because he is known to be a strong protagonist of that country's bid to acquire nuclear weapons.

As Chief of Military Intelligence, he has been exercising the overall responsibility for the security of Kahuta and other nuclear establishments in Pakistan, which meant that he had to work in close concert with Dr. Abdul Qadir Khan and others engaged in the bomb project.

Though Gen. Ziaul Haq retains his dual position as President and chief of Army Staff, the elevation of Gen. Akhtar Abdul Rahman Khan could not have been done except with the intention of associating him more closely with Pakistan's bomb project and providing effective liaison between the Army and the nuclear establishment.

Sharp difference: According to well-informed diplomatic sources there have been sharp differences between the Prime Minister of Pakistan, Mr. Mohammed Khan Junejo, who sees no harm in keeping up the pretence that his Government remains committed to using nuclear power only for peaceful purposes and the hard-headed Army Generals who have set their heart on acquiring the nuclear capability as early as possible.

The outgoing Chairman of the Joint Chiefs of Staff, Gen. Rahimuddin Khan, is not only a Zia loyalist but also related to him since his son is married to the daughter of Gen. Zia. In spite of this close relationship, Gen. Zia has not given him an extension, because he presumably wanted a tougher one like Gen. Akhtar Abdul Rahman Khan in this key position.

The operative head of the Pakistan Army, Gen. K.M. Arif, the Vice-Chief of Staff, is also retiring from the Army, but he is probably earmarked for a more important post in a civilian garb after shedding his military uniform. He would continue to remain as one of Gen. Zia's closest confidants performing such tasks that are assigned to him to sustain the Army grip on the country and the Government.

It is against this general background that many in senior positions in the Government of India who are otherwise well disposed towards Pakistan have been wondering whether Gen. Zia really interested in better Indo-Pakistan relations. During his recent visit to Delhi, he talked once again of his desire for improved political, economic and social contacts between the two countries and their peoples.

Rigid postures: But on his return to Islamabad, Gen. Zia's Government has reverted to the old rigid postures with no signs of any flexibility whether it is on trade, reopening of a southern land route, encouragement of more travel and tourism, or even exchange of newspapers, films and other items of cultural relations.

The much talked of spirit of bilateralism is totally absent in the policies and actions of the Pakistan Government, not only in relation to its nuclear pursuits but also in such small matters as observance of nominal good neighbourly relations.

The Indian experts on Pakistan have been taken aback by the revival of the virulent anti-Indian propaganda in some sections of the Pakistani Press accusing India of a formidable expansion of its military strength posing a grave threat to Pakistan. And the increase in the Indian defence budget is being used as an excuse to malign India as a war-mongering nation with hostile intentions.

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CSO: 5100/4737

AFP CITES POLL ON INDIA'S USE OF NUCLEAR WEAPONS

BK191237 Hong Kong AFP in English 1202 GMT 19 Mar 87

[Text] Islamabad, March 19 (AFP)— Fifty percent of Pakistanis fear that India would use nuclear weapons against Pakistan in case of war, a Pakistani survey published here Thursday said.

Only 13 percent out of a sample of 2,000 thought that India will not use nuclear weapons while 37 percent did not give any opinion, according to a survey recently conducted by the Gallup Pakistan (Pakistan Institute of Public Opinion) in 75 statistically selected urban localities and 100 villages all over the country.

The fear among the young Pakistanis is higher, the report said. It said that "54 percent of those under the age of 30 were of the opinion that India will use nuclear weapons compared with 48 percent of those above sixty".

In the provinces of Sind and Punjab, bordering India, the threat is felt "particularly strongly" where more than 55 percent said that in case of war India will use nuclear weapons.

About the possibilities of war with India "only 12 percent of the population believed there were no chances of war between the [countries] report said.

/9274

CSO: 5100/4731

'VAST' INDIAN CAPACITY FOR MAKING NUCLEAR WEAPONS

BK131527 Karachi DAWN in English 6 Mar 87 p 7

[Editorial: "India's Outcry: Facts and Fiction"]

[Text] The Indian Prime Minister's statement in Lok Sabha on Tuesday about Pakistan's "clandestine efforts to produce an atomic bomb", and his diatribe against those who can dissuade it from this course (impliedly the U.S.), is strange logic. Mr Rajiv Gandhi is also reported to have asked his External Affairs and Defence Ministries to investigate the "consequence" of the "disclosure about a Pakistani bomb" made by an Indian journalist supposedly on the basis of an "interview" with the renowned Pakistani nuclear physicist, Dr A.Q. Khan. Whatever the truth about the meeting between the Pakistani scientist and the Indian journalist, Mr Kuldeep Nayyar, something still shrouded in a miasma of mystery and confusion, let us look at the relevant facts as they are. Some of these are incontrovertible even when viewed from the Indian side. Not even a single super-patriot in India has so far claimed that Pakistan has conducted a nuclear explosion. But India's nuclear test explosion in 1974 was a self-confessed act. It does not need to be proved. To know the truth, one must simply refuse to be taken in by New Delhi's sophistry that by the 1974 Rajasthan explosion the country became a "nuclear power but not a nuclear weapons power". It is, indeed, a fact of history that it took the first atomic bombs to be produced and used only a few weeks after that fateful first nuclear test in 1945 in the Nevada desert.

The ability to make and explode a nuclear device, for whatever motive, demonstrates the capability to make a bomb. This is as simple as that. As a British daily had aptly remarked then: the blast conferred on India an easy capability of dropping an atomic bomb on a Pakistani city. Mrs Indira Gandhi had then felt free to declare: "India's nuclear policy is under constant review... the defence of our territorial integrity will be the paramount consideration guiding our policy in this field." Her Foreign Minister, Sardar Swaran Singh, elaborated it by saying that "India might have to proceed with development of nuclear energy for non-peaceful purposes". Eleven years after, in 1985, India demonstrated, within full view of the international media, its capability to build and run a fast breeder reactor with domestic technology and fuel. A fast breeder is suitable for uranium enrichment. It can produce weaponsgrade material that can be used for building nuclear weapons. This development demonstrated India's double capacity for making bombs — using either

plutonium or enriched uranium. Today India possesses a vast capacity for making nuclear weapons. Whether or not it has atomic bombs in the basement or on the shelf in an unassembled form is a matter for speculation since this is a well-kept secret. Not even the staunchest protagonists of non-proliferation in the West or in the East would like to talk about the Indian bomb. Such a thing is so unfashionable. One may add to the nuclear weapon capability India's drive for the acquisition of blasted conventional armaments. The budget presented by Mr Gandhi in the Indian Parliament last week records a big jump in defence spending, which has gone up by 22 per cent over the last budget to Rs 12,000 crore. This is part of a rapid escalation from year to year.

Because of this, the overall deficit in this year's budget is estimated to exceed Rs 5,000 crore. This speaks of an extraordinary pattern of priorities for a country which professes a strong commitment to the removal of poverty. Of course, nobody denies that this is a matter of sovereign privilege. Yet the fact remains that the scale of the Indian arms drive is too big for the comfort of India's small neighbours.

Note needs to be taken of New Delhi's efforts to arrange for the Indian community in the U.S. to launch a big media campaign and stage a demonstration in Washington against the reported U.S. plan for the sale of AWACS to Pakistan. The timing and place for the planned show are significant. The rally will be held on the Capitol Hill where a Congressional panel is due to begin hearings on a new 4.02 billion dollar U.S. aid package programme for Pakistan some time this month. The clear intention is to hinder the chances of Pakistan getting the AWACS and the U.S. aid. This stance must be seen in conjunction with certain interesting facts. India does not think the acquisition of AWACS base in itself. It is already planning to build its own version of AWACS. U.S. money, high technology and military equipment of certain types are not repugnant either. India is already negotiating to acquire hundreds of U.S. aircraft engines and super-computers, both of which are of military value. It is also looking for other sophisticated products of U.S. technology. Yet New Delhi does not want to miss any opportunity to question the motives of its small neighbours and obstruct their acquisition of the means of improving their economic situation and defence capacity. It would be so much better for this region if India were to get reconciled to the fact that whether it is a question of the sale of AWACS or the U.S. aid to Pakistan, such matters have to be decided on the basis of the needs and perceptions of the two contracting parties, and not according to the subjective likes and dislikes of any third country. Any undue interest of this kind in the internal affairs of its neighbours and any overbearing manner and style, which India never stops displaying, are a clear negation of the principles of sovereign equality and non-interference which are universally recognised as the basis of State relations and which specifically form the foundation of SAARC [South Asian Association for Regional Cooperation] and NAM [Nonaligned Movement]

RELEVANCE OF 'ZIONIST NUCLEAR THREAT' VIEWED

BK310705 Islamabad THE MUSLIM in English 19 Mar 87 p 4

[Editorial: "Friends Not Masters"]

[Text] Ambassador Jamshed Marker, Pakistan's envoy to the White House, has duly reflected the consensus of the people of Pakistan by declaring that we do not seek the patronage of the U.S. It sounds like a loud echo of President Ayub's 'Friends Not Masters', a thought which struck the late dictator only when the U.S. had begun to move against him. Denying the Bomb is hardly necessary now, especially when even the U.S. is willing to concede our right to nuclear weapon capability, both on account of the national will behind it and the compulsions of the regional situation.

Recent assertions regarding Pakistan's nuclear nexus have somehow been Indo-Pakcentric, glossing over the reality that Pakistan's threat perceptions are as relevant to Israel as to India; logically, they are viewed as a joint threat to serve imperialist designs. If India's track record of three invasions against Pakistan is bad, Israel's three invasions against the Muslim World are no less reprehensible. After all Pakistan cannot remain impervious to the inimical and insidious design of the Zionist entity to dominate South-West Asia which comprises mostly Muslim lands. The ultimate certification of this danger comes from none other than the OIC Secretary General, Syed Sharifuddin Pirzada, who has missed no opportunity or occasion to drive home the reality of the threat and to emphasize that this perception is shared by all in the OIC, who otherwise are at odds with one another on many an issue.

Moreover, since the Zionist entity has a pariah status among the majority of nations, its proclivity to act callously cannot be ignored. Hopefully, policy makers will not succumb to the temptation of even tactically taking the Zionist nuclear threat lightly. They must have probably been convinced by now of the short-shelf life of the Zionist entity and its consequent inclination to act in desperation.

/9716

CSO: 5100/4735

ASSEMBLY MEMBERS DISCUSS KHAN INTERVIEW

Islamabad THE MUSLIM in English 6 Mar 87 pp 1, 8

[Article by Anwar Iqbal]

[Text]

ISLAMABAD, March 5: Dr. A.Q. Khan's controversial interview to an Indian journalist seems to have injected a new lease of life in the otherwise dull corridors and galleries of the National Assembly. Members and journalists who usually spend their afternoons dozing in the cafeteria after an hour or two in the gallery, now have a new subject to talk about: "the bomb".

While the members have a careful approach, the journalists are not so cautious. Divided in general groups, they indulge in gossiping, rumour-mongering, and in mud-slinging. Sitting among them is a pain and it is more so when one sees the MNAs laughing in their sleeves after they leave their tables. "We thought you're was a united community but what I get, surprise me," commented a POG MNA.

Air Marshal (ret'd) Noor Khan who usually keeps his cool and refrains from getting involved in petty controversies also noted with dismay what was happening before him. "There is no question of treason. It is absolutely 'rubbish' to say this or that man was a traitor. It is like calling Reagan a traitor because he sold the guns to the Iranians. I believe that whatever was done, it was done in good faith. Those who were involved in the controversy were convinced they were serving the interests of the country. Now, whether they were mistaken like, Out. North of the Iron-gate or not that is a different

'question', he commented.

Mr. M.P. Bhenders, another Opposition MNA was also more or less of the same view. He thought that things were not as simple as they appeared. It was wrong to blame one person. Rather people should wait for the dust to settle

down before passing verdicts.

Syed Fakhr Imam who also spoke on the nuclear issue inside the House quoted the example of an Israeli scientist who had leaked the story of Israeli bombs to London's Sunday Times. When the story was published, the Israelis reacted very strongly. The scientist disappeared from the scene and it was said that he had been kidnapped by the Israeli agents.

However, later it was found that the story was calculated leak which enjoyed the blessings of the Israeli government who wanted to tell the world about their bombs.

Though, Fakhr Imam and Javed Hashmi both referred to Dr. A.Q. Khan's controversial interview on the floor of the House as well, it was Liaquat Baluch who raised the resignation of the Editor of The Muslim. Inside the assembly, "The Interview," he said, enjoyed the approval of some high-ups in the government. Why are they now trying to misguide the people by backing out?

Earlier, during a debate on science and technology Fakhr Imam asked the Minister for Parliament,

tary, Affairs to state categorically whether Pakistan had a bomb or not. "We don't have a bomb and we have no intentions of making one," replied Wassam Sajid.

Talking about the demand for an enquiry into the whole affair one MNA said he would like to know why didn't the government try to stop the interview from being published in Pakistan when they already knew about it. It was published in the Indian and British papers before it was published here. He said according to his information the Pakistan embassy in London had even refused to issue a denial when the British newspapers asked for their version on Saturday evening before using Kuldeep's story.

However, ignoring these facts a group of politically-motivated newsmen continued spitting fire and venom in corner of the cafeteria. While maintaining their distance from those who did not share their ideas, they kept talking among themselves. "Traitors, foreign agents, enemies of Pakistan and Islam..." one could only hear such words which were said aloud, perhaps, with the purpose to be heard.

And that's when one felt how it must have hurt those who are always on the receiving end of such vicious attacks. "I don't know who is a traitor and who a patriot. But I know what makes a traitor" commented a journalist who was listening to them.

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CSO: 5100/4732

PAPER EXPRESSES RESENTMENT OVER U.S. PRESSURE ON NUCLEAR PROGRAM

BK221531 Karachi NAWA-E WAQT in Urdu 10 Mar 87 p 10

[Editorial: "Nuclear Program--Unreasonable U.S. Restrictions"]

[Text] Replying to adjournment motions in the National Assembly, Minister of State for Foreign Affairs Zain Noorani said that Pakistan's peaceful nuclear program will go on no matter what difficulties we have to face. The adjournment motions moved by the National Assembly members had sought discussion of the U.S. ambassador's warning that if Pakistan does not sign the nuclear nonproliferation treaty, U.S. aid will be stopped. In his reply, the minister categorically stated that Pakistan will not accept any unilateral restrictions, but it will accede to any such agreements that the other side--India--is also ready to comply with. The United States is continuously pressuring Pakistan on account of its nuclear program and propaganda is put about that Pakistan is manufacturing an "atomic bomb" and that it will be sold to Qadhdhafi or to Iran and will be used against Israel. In fact, this is nothing but baseless propaganda aimed at maligning Pakistan alone while the United States closes its eyes in the cases of India and Israel which are not only pursuing research but have been declared nuclear powers.

The United States stopped aid to Pakistan in 1979 as a result of the Symington Amendment which provides that the United States cannot provide military or economic aid to countries which achieve uranium enrichment capability after 1977. Had the United States been sincere in its stand in the light of this legislation, it could have stopped aid to India and Israel as well. India has openly declared on a number of occasions that it can enrich uranium to any level, but the U.S. continues to provide aid to India, closing its eyes to the latter's pronouncements. However, when Pakistan's case comes up for consideration, everybody in the U.S. suddenly remembers the Symington Amendment.

A few weeks ago, U.S. Ambassador to Pakistan Dean Hinton openly warned that if Pakistan does not abandon its nuclear path, U.S. aid will be stopped. Earlier, when U.S. Assistant Secretary of State Armacost came to Pakistan for discussions on the Afghanistan problem, he also pressured Pakistan to sign the nuclear nonproliferation treaty unilaterally. At that time, the Pakistani people expressed deep concern over such reports and condemned the U.S. pressure on Pakistan. Now Zain Noorani has stated that the U.S. is free

to decide which conditions are acceptable to us. We have clarified our position and we are not ready to accept unilateral restrictions on our sovereignty and independence and will not flinch from any sacrifices in this regard. We were put to the test in 1979 when we preferred to renounce aid. Now Pakistan is again facing a similar situation to that in 1979, and a great propaganda drive is being carried out against our nuclear program to get the aid stopped. The Indian and Jewish lobbies are very active in this regard. India, in particular, has sent delegations of film actors, intellectuals, and other propaganda experts to the United States and they are raising a rumpus about Pakistan's nuclear program and using every trick to influence the U.S. House of Representatives where debate on the future \$4.2 billion aid package for Pakistan is underway.

The government of Pakistan has maintained a consistent stand on its nuclear program and has described it as totally peaceful. Pakistan has always expressed willingness to abide by the nuclear nonproliferation treaty if India also signs it. Pakistan on its part has always denounced the proliferation of nuclear weapons and has also called for making the Indian Ocean region a nuclear-free zone, but it is regrettable that India seems not to be ready to accept these restrictions and the United States does not seem to be in a position to pressure India. Everybody, it seems, is willing to spurn Pakistan, but nobody is ready to consider its legitimate requirements, even though Pakistan is facing a crisis in the field of energy. Nuclear energy is badly needed by hospitals, while the development of nuclear technology is essential for producing improved varieties of seeds, saving crops from disease, and storing them safely in warehouses.

More specifically, when India and a small country in the region, Israel, have developed atomic bombs and are constantly pursuing research activities to develop more nuclear weapons without bowing to any pressure, Pakistan cannot neglect its defense. In this age it is essential to become a nuclear power to prevent a nuclear war. It is a historically proven fact that during World War II the United States used the atomic bomb at a time when the enemy had no nuclear weapons of its own, but when a number of countries developed atomic bombs after the war, their nuclear strength proved to be a means to prevent the outbreak of a nuclear war. Therefore, so long as India does not sign the nuclear proliferation treaty, Pakistan should also keep its nuclear options open.

Under the present circumstances, imposition of any restrictions by the United States on the future aid program will be tantamount to hostility against Pakistan. It is therefore hoped that the U.S. Government will consider the issue of the aid by abandoning its policy of putting unilateral and unjust pressure on Pakistan under the influence of baseless propaganda carried out by others. If any regrettable decision is made in this regard, then in the words of Zain Noorani: "There will be no compromise on national sovereignty and independence."

/9738

CSO: 5100/4736

NUCLEAR ISSUE: ANALYST FAULTS U.S. POLICY

Islamabad THE MUSLIM in English 5 Mar 87 pp 4-5

[Article by Ghani Elrabie]

[Text]

It was awfully nice of Ambassador Dean Hinton to invite Pakistan "to take the high moral ground" on the nuclear issue, instead of claiming, it himself on behalf of his country. Whether the sacrifice was motivated by personal modesty or national vulnerability will be known after his advice to Pakistan at the Islamabad Institute of Strategic Studies, on February 16, has been analysed.

"Now often", he asked rhetorically, "is the United States charged with unfair discrimination against Pakistan vis-a-vis India? Our law prohibits us from significant nuclear cooperation with any non-weapon state which is unwilling to have full-scope safeguards. We comply with these laws whether the case is Pakistan, India, South Africa or Israel".

A survey of "The New Nuclear Nations" by Carnegie Endowment's Leonard Spector reveals that South Africa has a centrifuge plant at Valindaba, in operation since 1977, with capacity to produce 50 kg of enriched uranium every year. It can attain 90 per cent enrichment and consequently manufacture two to three weapons annually. The facility is not subject to IAEA inspection and South Africa has not signed NPT. The Union's Reprocessing/Uranium Conversion and Fuel Fabrication plants at Valindaba and Pelindaba also are not open to inspection.

ENRICHMENT PLANT

Among those who have helped build the forbidden enrichment plant is the Foxboro Corporation of USA. Worse, demands Spector, Pretoria appears to have betrayed the US Administration's "conciliatory" non-proliferation stand by quietly hiring more than forty US reactor operators and technicians, many of them illegally, for its power plant. In a further show of American benevolence, the Carter White House dismissed as "probably, not a nuclear explosion" a flash off the South African coast in 1979, clearly identified by America's own satellite as a "nuclear detonation". Most scientists were agreed on its being a nuclear explosion; they only differed on whether the bomb had been tested by South Africa alone or in collaboration with Israel. These precisely are the countries USA has helped most, militarily, economically and politically with recurring use of its veto in the Security Council, to the extent of damaging its own credibility with its Western allies and among the non-aligned nations.

Israel's nuclear complex is topped by the Dimona reactor, acquired secretly in the late 1950's from France, but stocked mostly with nuclear fuel allegedly "stolen" from USA — 100 kilos of highly enriched uranium (enough for four bombs) from a US processing plant at Apollo, Pennsylvania, around mid-1960's; 200 metric tons of uranium concentrate offloaded a ship in the Mediterranean, in

1968, and 47 metric tons of uranium sneaked through Luxembourg in 1984. Hundreds of Krypton switches used in nuclear weapons trigger mechanism were "smuggled" out of USA to Israel between 1979 and 1983, and USA has since rewarded this spirit of free enterprise by establishing a common trade zone and strategic relationship with Israel. The upshot is that Israel today has two research reactors, one uranium purification and one uranium conversion plant, one heavy water and one fuel fabrication plant, and a major reprocessing plant producing eight to ten kilos of plutonium every year, and finally an enrichment plant manufacturing two to three kilos of high-grade uranium every year and experimenting with a revolutionary new technique of enrichment with laser.

According to Peter Fry's "Israel's Nuclear Arsenal", the consensus of most published analysts is that Israel possesses between 20 and 25 Nagasaki-size nuclear devices and it is quietly adding one to two weapons to its arsenal every year. However, two 1985 reports in Aerospace Daily, quoted US sources as saying that Israel's nuclear arsenal has expanded well beyond the level reported above and since 1981, it has deployed nuclear-armed Jericho II missiles in the Negev desert and possibly the Golan Heights. The author of the Reports, Richard Sale, during a July 1985 interview on NBC's "Nightly News" said that US scientists had been involved in the development of Jericho II, and material going into their manufact-

ure, including fuel compounds, inertial/guidance system components and even the shells of the rockets, had been obtained from the United States. On the same broadcast, Anthony Cordesman, a recognized authority on Middle East military affairs estimated, there are at least 100 nuclear weapons in the Israeli inventory, possibly over 140.

ISRAEL'S ARSENAL

The latest estimates assert Israel is producing 40 kilos of plutonium, enough to manufacture 10 bombs a year, each large enough to blow up a major city. Israel's projected arsenal of 100 to 200 weapons makes it the sixth most powerful nuclear nation on earth. This assessment has been made by the prestigious London paper, the Sunday Times, in its issue of October 4, 1986, on the evidence of an Israeli technician, 31-year old Mordechai Vanunu, who worked for 10 years in a bunker at the bottom of a six-storey building buried deep in the Negev desert and has produced pictures for backup. The Sunday Times cited a number of nuclear authorities in UK and USA to confirm the authenticity of information given by the Israeli technician. It quoted nuclear expert, Theodore Taylor, as saying: "There should no longer be any doubt that Israel is, and for at least a decade, has been a full-fledged nuclear weapons state". The fact that the Israelis have abducted him, taken him back home and put him in jail and on trial on charge of high treason shows Vanunu was not telling any cock and bull story — but the embarrassingly honest truth.

The Carnegie Report regrets, there has been no apparent effort by the United States or its European partners, the powers the most able to influence Israeli behaviour, to prevent the slow expansion. Indeed it is rarely ever mentioned. Even a UN document dated September 18, 1981 and titled "Israeli Nuclear Armament" was hushed up or ignored. A sinister conspiracy of silence has enveloped Israel's nuclear breakthrough.

VEIL OF SECRECY

Now that the veil of secrecy has finally been torn and USA confronted with irrefutable evidence of Israel possessing a nuclear device, a story nearly as big as the Sunday Times disclosure should show how the United States has reacted. Will it apply the

Symington Amendment to Israel to withhold the billions of dollars of economic and military assistance to Israel. (USA gives Israel almost the same amount every year as it gives Pakistan in six years.) That indeed will be the day.

The US Ambassador, in his February 16 speech, claimed: "Since 1977, the Symington Amendment to our Foreign Assistance legislation has prohibited any direct US assistance to any country which delivers or receives unsafe-guarded nuclear enrichment or re-processing equipment, materials or technology. It was this law that forced President Carter in 1979 to suspend assistance to Pakistan. This was not a matter of choice for the President and it had nothing to do with US feelings toward Pakistan. It was — and is — our law".

The test of any law, by any definition, is universality of application. Has it been equally applied to all South Africa, Israel, Pakistan and India? No way. Only Pakistan has been picked up for the privilege, and that too, on the basis of hearsay and some circumstantial evidence, suggesting not that Pakistan has acquired a nuclear device, but that Pakistan may be seeking to acquire nuclear capability. Even a veteran Pak-baiter like Senator Cranston has had to concede he has no evidence that Pakistan has actually acquired a nuclear device.

He is among those soothsayers who, on the basis of so-called intelligence reports, have been setting fresh dates every year for the ever-imminent Pakistani explosion. Some even identified the probable site, a tunnel in Baluchistan, others contesting it, placed it in a desert site bordering India, perhaps to reciprocate the Indian gesture of 1974. But the much-promised explosion never occurred.

NEW PLOY

Presumably sick and tired of the yearly ritual of predicting explosions that failed to materialise, the Washington Post tried a new ploy this time. In its issue of November 4, 1986 it claimed "according to classified defence intelligence reports, Pakistan detonated a big explosion device between September 19 and September 21 as part of its continuing efforts to build an implosion-type nuclear weapon". Unfortunately, the effect was spoiled by the Indian Atomic Energy Commission declaring the earth tremors had been caused by an earthquake.

However, conceding for the sake of argument that Pakistan is determinedly groping towards nuclear

capability, the question still remains why this law has not been applied to Israel which herself does not deny having a bomb and which has since been proved to be in possession of a large stockpile of nuclear weapons.

When Ambassador Hinson proclaimed triumphantly "The truth of the matter is that we now discriminate in favour of Pakistan, since Pakistan enjoys a unique exception from our laws that remain applicable to other countries", he was right only in a superficial, legalistic way.

One wonders who learns from whom: our SDO's from US officials or the other way round, for both are following the convenient formula that one way to avoid embarrassment is not to register an FIR. The American Administration has avoided an immense amount of political fallout by never raising the question of Israeli violation of the Symington Amendment, and any Congressman who dare raise it goes out into the wilderness. It has happened to several of them, including a Chairman of the Senate Foreign Relations Committee. That makes Pakistan the sole beneficiary of a Symington Amendment waiver. No bailout has been found necessary for others as no case is ever registered against them.

Pakistan has also achieved another distinction. The prohibitions of Sections 669 and 670 of the Foreign Assistance Act (Symington and Glenn Amendments) originally applied only to "detonation" of a nuclear device. These have since been sighted to apply even to "possession" of a device. As this could have been invoked against Israel, known to be in possession of a stockpile, the law, as amended by Senate and House Foreign Relations Committee in March 1985, makes it clear that it applies only to Pakistan. The Mathias-Cranston-Dodd Amendment said, no aid would be provided to Pakistan and no military equipment or technology transferred unless the US President certified that "Pakistan does not possess a nuclear explosive device and that the proposed US assistance programme will reduce significantly the risk of Pakistan possessing a nuclear explosive device". Formulating a law specifically to hit one individual (by name) must be unique in the history of lawmaking in the world.

The American envoy might have sounded more convincing if he had talked of the discrimination in favour of India in June 1980 when President Jimmy Carter twisted the US law, overruled the unanimous verdict of the nation's Nuclear Regulatory Commission

and defied the vote of the House to ship an additional 38 tons of enriched uranium to India — even after it had exploded a nuclear device. Said the Washington Post in an editorial on June 22: "The legislators, at least, seem determined to correct the mistake made in 1974 when the United States failed to make any protest to India's first nuclear explosion — which relied on illegal use of US-supplied heavy water". The Los Angeles Times, in an editorial the same day remarked: "If US cannot enforce the non-proliferation law against India — which is in flat unambiguous violation — how can it credibly even pressure on Pakistan or any other country not to go ahead with suspect nuclear programmes of its own? The Wall Street Journal asked if the US is willing to waive inspection for a country that has already misused the nuclear fuel to make a bomb — "double-crossed us" — what will be our response to others?"

The U.S. President offered the "other cheek" yet again when in 1982 his Administration arranged with France to continue to supply nuclear fuel to India in the future unhindered by the constraints of the Nuclear Non-proliferation Treaty, which tied American hands. The same USA forced France to cancel an agreement on a reprocessing plant for Pakistan. The net result is that India today has 10 power reactors, seven research reactors, three reprocessing facilities and seven heavy water plants. The latest is that fast-breeder reactor at Kalpakkam near Madras, which, in fact, is an assembly-line factory for bomb production. According to one estimate India can produce one bomb every week. The Carnegie Endowment Publication sums it up thus: "Between mid-1984 and mid-1985, there was increasing evidence that India is moving towards building an undeclared nuclear arsenal".

To quote Leonard Spector: In an interview with Le Monde on June 5, 1985, Prime Minister Rajiv Gandhi hinted India had already made all the components for nuclear arms, permitting their rapid assembly once a decision to fabricate them was taken. Rajiv told Le Monde: "If we decided to become a nuclear power, it would take a few weeks, or a few months". This undoubtedly means all the components of a bomb are already on the assembly line and the bomb is only a few screw-driver turns away. There is no other way it can complete the job in weeks. In fact, according to nuclear specialists, India acquired the weapon when it exploded a so-called peaceful device 13 years ago, and she has since refined the weapon. Therefore, Ambassador Hinton's warning that "Pakistan should not push India to produce nuclear weapons" is misdirected. India is not waiting to be pushed she already has the weapon.

Further, Pakistan's abstinence will make no difference to India whose nuclear policy is shaped not by what Pakistan does or refrains from doing, but by her perception of what will equate her with China. She will not sign NPT, nor accept any non-proliferation proposals nor permit inspection of any of her installations — she has barred inspection of 23 of her 27 odd nuclear facilities — until she is convinced she has a nuclear stockpile comparable to that of the People's Republic.

And the United States actively is helping her along. Despite the past history of misuse of the US-supplied heavy water to detonate a bomb in 1974, Washington has agreed to sell India the most sophisticated supercomputer, known to be particularly useful in precision manufacture of nuclear weaponry.

While the US Envoy cites the massive nuclear capability of India to overawe Pakistan, he is nowhere near suggesting that the Symington Amendment be applied to India too.

Also he wants Pakistan to surrender the right to a nuclear deterrent, however modest, because India is too powerful. On that analogy, he should be tendering the same advice to UK and France which have only 500 to 700 warheads against USSR's 27,000. But as he is not, he would be hard put to explaining the inconsistency. He should find it equally difficult to explain the contradiction between his advice to Pakistan to disarm by signing NPT unilaterally and the Reagan Administration's declared policy of expecting India and Pakistan equally to abjure nuclear proliferation. This was reaffirmed

before the House Foreign Affairs Subcommittee for Asian and Pacific Affairs in Washington on February 25 on behalf of the State Department by Ambassador Richard Kennedy who urged an Indo-Pakistan dialogue on a follow-up to President Ziaul Haq's 1985 proposals. These proposals call for simultaneous Indo-Pakistan signature of NPT, acceptance of full-scope safeguards or International Inspection or bilateral inspection of each other's nuclear facilities, or a binding joint declaration renouncing the acquisition of nuclear weapons.

The conflict between the views of the US Ambassador to Pakistan and the US Ambassador for Nuclear Affairs in the State Department is very intriguing. Is Ambassador Hinton, in his enthusiasm, exceeding his official mandate, or is he trying to personally impress the new Democratic Congress, or is he carrying out Washington's secret instruction on issues other than nuclear non-proliferation, such as Afghanistan.

Whatever policy purpose may be motivating this enmeshing, it certainly is neither gracious nor opportune, and on the issue of nuclear non-proliferation, whether Pakistan chooses to take "the high moral ground" or not, the United States record definitely bars her from any claim to it.

SCIENTIST VOICES DISAPPROVAL OF NUCLEAR ENERGY OPTION

Islamabad THE MUSLIM in English 26 Feb 87 p 8

[Article by Anwar Iqbal]

[Text]

ISLAMABAD, Feb. 25: "The Kahuta plant is not capable of making a nuclear bomb. If we say we are capable of making one, we are only playing poker, and one day somebody is going to call our bluff". This was Mr. I. H. Usmani, former Chairman of the Pakistan Atomic Energy Commission, who was interviewed here yesterday.

An eminent scientist and one of the founding fathers of Pakistan's civil bureaucracy, Mr. Usmani talked in detail about every aspect of Pakistan's nuclear option. His ideas were original, even shocking, but unlikely to find a favourable audience in the country. Strongly advocating hydro and other conventional sources of energy, the retired ICS officer endorsed Pakistan's nuclear option but only after "all other sources of energy have been tapped and exploited".

He described what a nuclear reactor was, how it worked, and what kind of a reactor Pakistan had at Kahuta. Telling how uranium ore is found in the form of two isotopes, 238 and 235, he said it is 235 that is needed for making nuclear energy. For making a bomb of the size of the one dropped at Hiroshima, at least 10 kg of uranium 235 of the purest quality is needed. Since the percentage of 235 in uranium ore is only point seven per cent, hence the need of uranium purification and enrichment.

The Kahuta plant, said Mr. Usmani, is a centrifugal plant. "Theoretically it is possible to obtain uranium 235 to 99.9 per cent purity, which is the minimum requirement for an atomic explosion, at a centrifugal plant

as well. However, for obtaining 10 kg of pure uranium 235 at such a plant, 7000 centrifuges will have to work day and night for one year at the speed of 3200 miles per hour. Since technology is not yet advanced enough to do so, the centrifugal plants in Europe have only been able to achieve an enrichment of 2.7 per cent. Uranium with this degree of enrichment can only be used as fuel for nuclear power generation but was far below the required standard for making a bomb.

"Thus", says Mr. Usmani, "even if we have been able to make a centrifugal plant of the same standard as the one in Holland, it can only provide fuel for power generation. Saying that the Kahuta plant has provided us with a nuclear option and now it was for us to decide whether we want a bomb or not, is like playing poker. If somebody tries to test our capability, we will have it."

"Having said that", says Mr. Usmani, "I would like to add that the capability to produce uranium fuel of 2.7 per cent purity is no small achievement. If we really achieved it, we must export the fuel. I am ready to buy it from the government if they are willing. We will find many customers in the international market. The uranium fuel has been a monopoly of Americans. The Europeans have only recently been able to produce their own fuel. If we have reached that landmark, we must also take the credit for it."

Mr. Usmani claimed that whenever the scientists tried to go beyond the 2.7 per cent level, it has resulted in blowing up the reactor. "That's why I say the President is absolutely right when he

says that we are not making a bomb at Kahuta. I suggest that instead of saying this he should say that we are not capable of making a bomb at Kahuta".

While technically rejecting the rumours that Pakistan was making a bomb, the former PAEC Chairman, who has also worked for the International Atomic Energy Agency and the UN and is now attached with the BCCI, launched a frontal attack on the nuclear powers for their hypocritical attitude towards the NPT Non-Proliferation Treaty). The USA and the USSR went on adding to their nuclear arsenal even after signing the NPT. He said the nuclear weapons these two countries have made since the signing of the NPT are sufficient to destroy the world 36 times over. "NPT is a discriminatory document. It is political blackmail. Why don't they stop their own nuclear race if they are serious about non-proliferation? How can Hinton (the American ambassador) lecture us on non-proliferation while his own country is now talking about Star Wars?"

Mr. Usmani also criticised the developing countries which were tempted by the nuclear option. Discussing Pakistan as a case he elaborated why Pakistan should prefer conventional sources of energy to nuclear source.

There is a genuine energy crisis in Pakistan. The country only produces 5000 mw of electricity annually which they plan to enhance upto 6000 mw by the end of the 6th Five Year Plan. On the other hand 14000 mw of electricity is produced in southern California alone. "We can't progress without developing our energy resources. By making a nuclear power generation station in Karachi we have proved that we

are capable of doing so. But before we go for more nuclear power, we will have to see if we have explored and tapped all conventional sources of power".

He said the total hydro power potential of Pakistan is 25000 mw out of which 10000 mw is in accessible area and remains unexplored.

"We need not wait for completion of big dams. Instead of one big dam of 2000 mw, we should go for small dams with a capacity of 100 to 200 mw each.

"We have a network of canals stretching over 11000 miles and we can generate 400 to 800 mw of electricity from these canals. In China they produce 5000 mw of power from such very small dams which is our total production.

"We should not forget that nuclear power is more costly. A nuclear power station with a capacity of 1000 mw takes ten years to complete and costs two billion dollars. While Kalabagh Dam with a capacity of 2500 mw will also cost about the same and will take ten years to complete. The power produced at Kalabagh will cost 1200 dollars per kw while from a nuclear station the cost will go up to dollar 2000 per kw.

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CSO: 5100/4734

BRIEFS

URANIUM EXPLORATION--The Nigerian Uranium Mining Company (NUMCO) has so far spent about N12 million on the exploration of uranium in parts of Gongola and Borno states since 1986. Already, work has begun on two uranium deposits with the greatest potentials at Misat and Michika areas of Gongola State. The Deputy General Manager of the Nigerian Mining Corporation (NMC) Alhaji Abdul Diko Gidado said this in Jos yesterday. [Text] [Lagos DAILY TIMES in English 5 Mar 87 p 20] /9274

CSO: 5100/33

JAPAN TO PURCHASE REPROCESSING TECHNOLOGY

Paris LE MONDE in French 23 Jan 87 p 1, 32

[Article by Jean-Francois Augereau: "Japan Opts for France's Nuclear Technology", first paragraph is LE MONDE introduction]

[Text] The French nuclear industry has just scored a major success overseas. Japan Nuclear Fuels Services (JNFS), which represents the interests of Japan's electric companies and several Japanese manufacturers, announced in Tokyo on Thursday, 22 January, that it has chosen French technology for its future nuclear reprocessing plant to be built at Rokkasho-mura, 1,000 kilometers north of Tokyo, on the Shimokita peninsula.

For the time being, the parties are associated by an agreement in principle. But a definitive contract is expected to be signed at the end of the first quarter of this year, with some 2 billion francs in financial repercussions. In reality, two contracts have been prepared:

1. The first has been agreed to by JNFS and by Societe generale pour les techniques nouvelles (SGN) [General Company for New Technologies] acting for the members of the Atomic Energy Commission (CEA). It establishes the condition under which the technologies to be used will be made available. They originated in research and development work done by the CEA and are being applied at La Hague by COGEMA [General Nuclear Materials Company]. This contract is expected to be worth 1.1 billion francs.
2. The second, agreed to by SGN and Mitsubishi Heavy Industries (which heads a consortium of Japanese manufacturers), should bring the SGN about 1 million hours of engineering work representing some 800 million francs.

Other clauses will be added concerning the training of a number of Japanese specialists, the regular exchange of information on the Rokkasho Mura plant, the monitoring of the facilities by the International Atomic Energy Agency (IAEA) in Vienna, the peaceful use of the facilities and a ban against making the technology available to a third party.

The agreement reached by the French and the Japanese will result in the construction of a plant valued at slightly more than 20 billion francs. The unit, which will have a [reprocessing] capacity of 800 metric tons per year, is

to adopt the systems and processes (1) that will be used at the plant (UP-3) being built by the SGN at La Hague for COGEMA. This agreement is the result of a long history of cooperation between the two countries in the field of nuclear energy. In effect, the SGN assisted the Japanese in building a small reprocessing facility at Toakai Mura where 300 metric tons of [spent] fuel have already been reprocessed. In addition, Japanese electric companies are clients of the French nuclear industry of long standing, through the intermediary of Eurodif, which supplies nearly 10 percent of the enriched uranium they use, and through COGEMA, which has signed contracts with them for the reprocessing of 2,500 metric tons of nuclear fuel.

But the agreement was also preceded by lengthy political and economic studies. Political studies were made to the extent that Japan has for a long time asserted its independence in the realm of energy and a desire to control the entire nuclear fuel cycle from the mining of uranium and the enrichment process to the reprocessing of spent fuel. Evidence of this are Japan's association with COGEMA in the mining of certain uranium deposits, its efforts to develop and build a plant for uranium enrichment by ultracentrifugation and, now, its decision to build a fuel reprocessing plant.

Economic studies were made in view of the ambitious program of nuclear power plant construction that Japan recently unveiled. At present, 32 light-water reactors fueled by enriched uranium are in service at some 15 different sites. But between now and the year 2030, no fewer than 20 additional reactors are contemplated. In light of all of this, Japan fervor and its desire to enter into the nuclear fuel reprocessing market are more readily understood. The first plant will serve to meet Japanese needs, but a second plant, slated for the year 2010, could give competition to French facilities.

FOOTNOTES

1. While the facility's core will be French, Japan has reserved the right to contract with Great Britain for its system of fission product concentration and with West Germany for a method of radioactive gas trapping.

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CSO: 5100/2424

INDONESIA, FRAMATOME AGREEMENT; BELGIAN ORDER DUE

Paris LE MONDE in French 31 Jan 87 p 24

[Article by V.M.: "Indonesia Turns Reactor Research Over to Framatome"]

[Text] The future development of nuclear power generation in the aftermath of the Chernobyl accident remains uncertain. It is true that most programs are continuing unabated: The International Atomic Energy Agency (IAEA) announced this week that 21 new reactors (1) were brought on line around the world last year, as the orders placed at the beginning of the decade were completed. The IAEA noted that no construction sites have been closed since the accident. In total, the world's nuclear power capacity at the end of 1986 consisted of 394 reactors in 26 countries, representing 15 percent of the world's production of electricity.

With regard to orders for new reactors, however, the situation is much less clear and numerous reports--both favorable and unfavorable--are buffeting the industry. On the one hand, certain countries that have been absent from the market for nuclear power plant construction or that had left it, are preparing future plans. This is true of Indonesia, which had little interest in nuclear power until now because of its oil and gas reserves, but it has just signed a memorandum of agreement with the French company Framatome [Franco-American Atomic Construction Company] for a study of a 600- to 900-megawatt reactor that would be paid for under a licensing arrangement. This project, if carried to completion, would enable Djakarta to provide for the country's energy needs in the next century, when its oil and gas reserves (after 18 years of production) will have been exhausted.

Similarly, Great Britain, which has not ordered any new reactors since 1980, may finally decide before the end of March to build a second generating unit at the Sizewell nuclear power station in the southeastern region of the country. An expert study submitted to the government this week at the end of a 4-years public inquiry concludes that this new reactor--which, unlike its predecessors, would use American pressurized water technology--is the best course to choose in seeking to provide for the country's electricity needs.

On the other hand, the Chernobyl accident has given pause to a number of countries already committed to nuclear power generation. After Finland and the Netherlands, Belgium may now defer the completion of its own program. The

Belgian secretary of state for energy declared on Tuesday, 27 January, that the government must await the outcome of a debate in Parliament on the consequences of Chernobyl before making a decision on its order for an eighth generating unit which would be built at Doel. French companies would perform half of the construction work. Under the agreements signed by France and Belgium, Brussels must give the goahead on this order before the end of March 1987. Penalties would apply in the event the schedule is not respected.

Finally, in Switzerland, a citizens' initiative proposing a moratorium on nuclear power plant construction has already received 130,000 signatures--more than the minimum required (100,000) in order for the promoters of the initiative to submit a proposed law to the vote of their countrymen. Signatures will be collected up to the end of February and the proposal is expected to be officially introduced in the spring.

FOOTNOTES

1. 6 in France; 5 in the United States; 2 in Canada, Czechoslovakia, West Germany and South Korea; 1 in Japan and Hungary

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CSO: 5100/2424

FIRE, ICE-BLOCKAGE SHUT DOWN SAINT-LAURENT-DES-EAUX

Paris LE FIGARO in French 26 Jan 87 p 11

[Article by J. P. C.]

[Text] Nearly 300,000 homes were left without electricity for a little more than an hour yesterday following an incident at the nuclear power plant at Saint-Laurent-des-Eaux in the Loir-et-Cher department.

It was 0430 hours when the plant's "A2," "B1" and "B2" generating units abruptly shut down following a fire in a distribution station which sends the electricity produced by the plant into the distribution network at 400,000 volts.

The incident, which required the intervention of firemen, resulted in a power outage for 150,000 consumers in the Loiret department, 100,000 in the Eure-et-Loir department and 45,000 in the vicinity of Blois in the Loir-et-Cher department.

For the consumers, the problem was solved in little more than an hour. However, 2 weeks ago, as the recent cold wave swept over France, the Saint-Laurent-des-Eaux station was confronted with a much more serious problem, when ice carried by the Loire River obstructed the channel through which cooling water is pumped to two of the power station's four reactors, thus forcing technicians to effect an emergency shut-down.

The three reactors that were subjected yesterday to this automatic procedure (known as "ilotage" [isolation] in the jargon of technicians at EDF [French Electric Company]) seem to have responded better this time than 2 weeks ago. This type of emergency shut-down occurs when the power distribution grid would be damaged if power continued to be supplied to it, either because of a severe drop in voltage in the grid or because of a shortage causing an overload in the lines remaining in service. The engineers admit that it is a "rough jolt" on the reactors to scale back in just a few seconds from operating at full power to only 15 percent, at which level they are producing only the strict minimum necessary to ensure their own internal operation.

When the first incident occurred at Saint-Laurent-des-Eaux, nearly a week of inspections were necessary before the A2 reactor could be restarted. The A1 reactor has not yet been put back in operation. But, as the EDF reported, the three reactors that were abruptly slowed down yesterday were reconnected to the power grid after only some routine checks and minor work. Perhaps this proves that the lessons learned from one incident will always serve to make the next one more readily overcome....

BRIEFS

UNIONS DEMAND FREEZE, SAFETY--The German Trade Union Federation (DGB) and the CFDT [French Democratic Confederation of Labor] have joined together in calling for a freeze of nuclear programs in Europe. In a joint declaration addressed to their respective heads of government, Messrs Chirac and Kohl, presented on 23 January, the two labor organizations ask that the energy policies of all European countries be revised in light of the Chernobyl accident toward the end of reducing dependency both on imported energy sources and on high-risk technologies. The two organizations acknowledge nonetheless that it will "not be possible to dispense with nuclear power stations for a determinate period of time," and that "the dangers to which the population is now exposed (...) can be tolerated only for a transitional period." Consequently, the CFDT and the DGB believe that, "given the current state of technology, no additional authorizations to build nuclear power plants should be granted in (their) respective countries or in Europe." They also ask that existing power plants undergo regular and rigorous safety inspections and that those not meeting the standards be closed down. Finally, the two confederations demand that the halt to orders for new reactors and the eventual shut-down of existing ones be accompanied by worker retraining programs at the companies concerned.

[Text] [Paris LE MONDE in French 27 Jan 87 p 45] 12413

FRG-USSR NUCLEAR REACTOR DEAL SIGNED--A collaboration agreement has just been signed by the West German group Innotech Energie from Essen to design, construct and put use a high temperature nuclear reactor (HTR). The project will cost slightly over 3 billion francs (DM 1 billion) and should have the energy output of 100 megawatts. According to the German group, the contracts detailing the problems of technology transfer, financing, and delivery will be ready in 18 months. Currently the Germans are practically the only ones in the world who have persistently continued to work on this new type of reactor, where the fuel is in the form of spheres, capable of sustaining temperatures of over 900 degrees. The whole thing is cooled by helium. The specialists expected a great deal from these high temperature reactors, particularly for coal gasification. But it has been very difficult to develop them, as evidenced by the fourteen years it took Schmehausen to perfect a West German 300 megawatt prototype, the construction of which has cost DM 4 billion.

[Text] [Paris LE MONDE in French 5-6 Apr 87 p 8]

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20 July 1987